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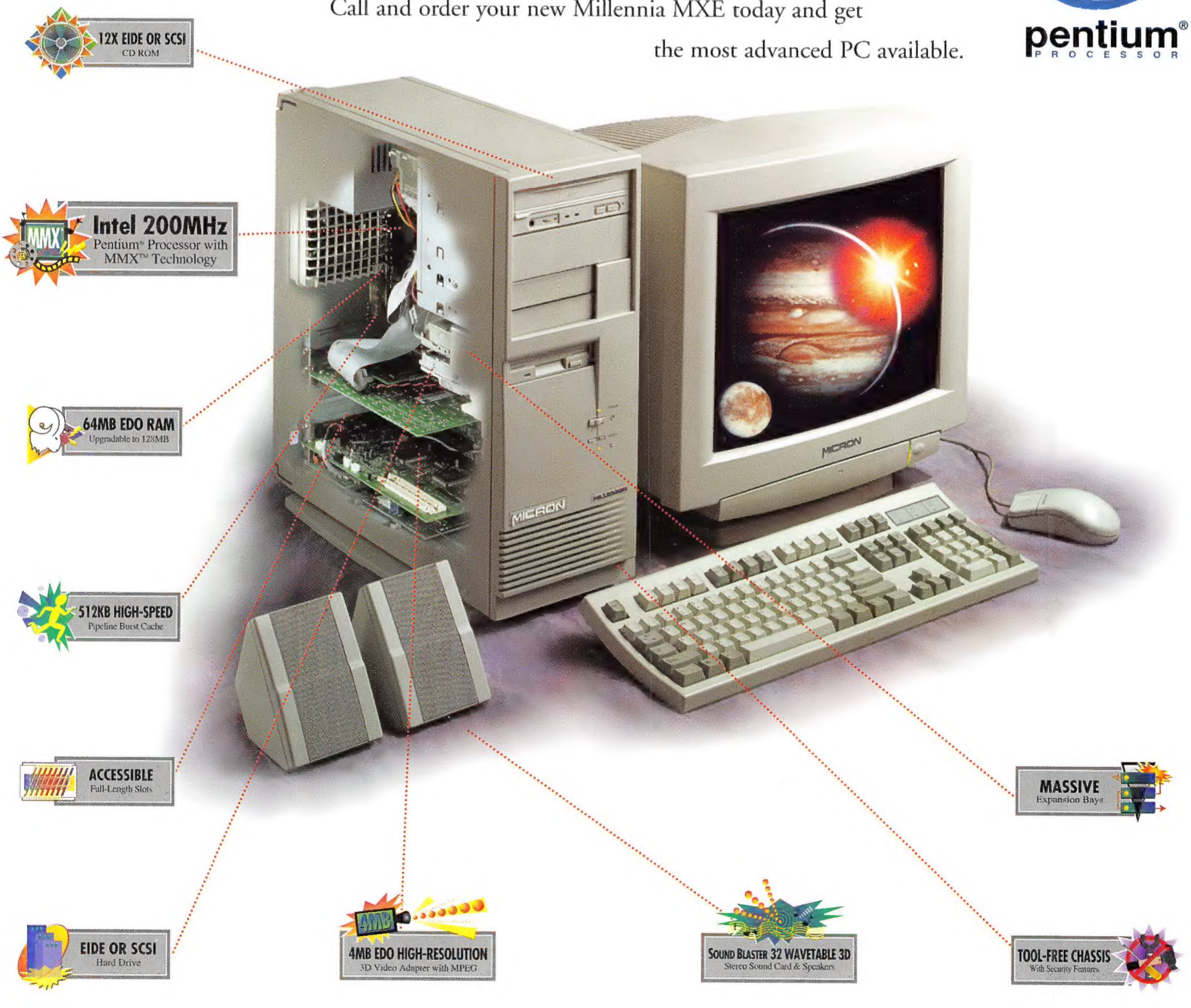
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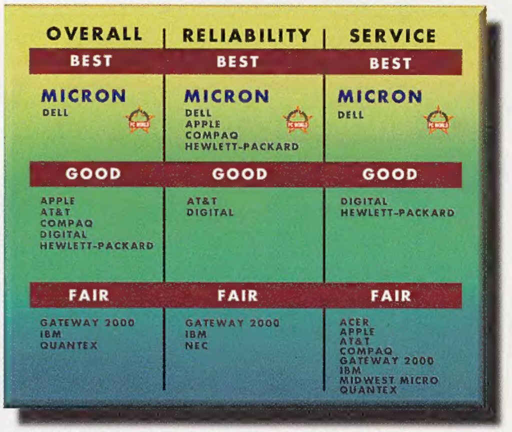

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- *NBA Full Court Press*
- *Tomb Raider*
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41 CD-R 4 Everyone!

CD-R technology has come home. Today, it's easier to use and more affordable than ever. This month's comprehensive discussion of the breakthroughs that are making this phenomenon possible is joined by cool CD-R projects, safe burn tips, and exhaustive reviews of all the latest hardware and software you need to start packing polymer platters now!

48 Get Your PC into Fighting Shape

For renewed strength and vigor, spend some quality time with your own personal trainer...
personal computer trainer, that is.
The *boot* guide to a leaner, meaner system, complete with its patented "Tighten, Trim, and Tuck Tips," will have your machine kicking butt and taking names in no time.
Also: Saddle up to the bootDisc *Juice Bar and drink deep from our invigorating blend of 100MB of potent utilities, gathered from around the World Wide Web.*

Lip 32

Meet the man who postponed Judgment Day. In an exclusive Lip interview, the creator of DirectX unveils what makes this miraculous new technology tick and tells us just why PC owners should give a damn about his brainchild.

He is Microsoft's Games Evangelist, but you can call him...

Alex St. John

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Go to Microsoft Excel 97. Press the CTRL key and push the Wheel forward or backward. You zoom in closer or zoom out farther. See how manageable even a massive spreadsheet becomes.

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To scroll through Web pages with Microsoft Internet Explorer, press the Wheel once and move the mouse downward. Your computer goes into AutoScroll mode. Automatically, rolling line by line through your entire document. Without even lifting a finger.

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IMAGINE PUBLISHING, INC.
Publisher: Matt Firme
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INTERNATIONAL LICENSING REPRESENTATIVE
Robert J. Abramson and Associates, Inc.
720 Post Road, Scarsdale, NY 10583

VOLUME 01, ISSUE 06
boot (ISSN #1088-5439) is published monthly by Imagine Publishing, Inc., 150 North Hill Drive, Suite 40, Brisbane, CA 94005, USA. Periodical class postage paid in Brisbane, CA and at additional mailing offices. Newsstand distribution is handled by Curtis Circulation Company. Basic subscription rates: one year (12 issues) U.S. **$39.90**, Canada **$53.90**. Canadian price includes postage and GST (GST #128220688). **POSTMASTER:** Send changes of address to *boot*, P.O.Box 51479, Boulder, CO 80328-1479.

Bulk Rate, U.S. Postage Paid,
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Standard Mail enclosed in the following editions: A3, B, B1, B2. CPC Int'l Pub Mail # 0781029. Outside the U.S. and Canada, price is $53.95, U.S. pre-paid funds only. For customer service, write *boot*, P.O. Box 51479, Boulder, CO 80328-1479, *boot*, 150 North Hill Drive, Brisbane, CA 94005. Imagine Publishing also publishes *PC Gamer, Next Generation, Mac Addict, Game Players* and *The Net*. Entire contents copyright 1996, Imagine Publishing, Inc. All rights reserved. Reproduction in whole or in part is prohibited. Imagine Publishing, Inc. is not affiliated with the companies or products covered in *boot*.
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EDITOR'S WORDS

Ain't nothin' like the real thing, baby

In the best of times, reality exceeds the boundaries of what we can imagine. These are those times.

Visionaries from H.G. Wells to Jules Verne to Arthur C. Clarke to Gene Roddenberry have all proposed a future where exotic new technologies enrich the human experience and lead to otherwise inaccessible adventure. Today's writers face a tremendous challenge: To go beyond the realm of what existing technology can accomplish.

Back in 1970, Alvin Toffler described a phenomenon he called "Future Shock," in the book of the same name. In essence, Toffler proposed that the state we perceive as "the future" was accelerating at such a rate that it overwhelmed the senses. Plugging into the global village, created by technology that advanced at an exponential rate, induced a state of shock. Instead of broadening horizons, we were in threat of slipping into stasis.

Today, only a handful of people have any sort of grasp on the breadth and depth of technology that actually exists.

Enter the "cyber" culture.

As a coping mechanism, a subculture has developed that embraces this racing progress. Typically attaching the tag line "cyber" to all their ventures, these people have realized the notions of Marinetti's 1909 *Futurist Manifesto,* when he wrote "Why should we look back, when what we want is to break down the mysterious doors of the Impossible? Time and Space died yesterday. We already live in the absolute, because we have created eternal, omnipresent speed." These people revere anything that embraces mankind's hurtling forward in time and attach spiritual significance to technology specifically. So desperate is their futurelust, that it hardly matters whether or not the science they embrace is real or fiction.

The "cyber" experience is, like many forms of spirituality, based on faith—not fact.

The shame of the matter is that the truth is so much more rewarding than the shallow fiction they propose. More often than not, while these people are fantasizing about some odd little widget that the world could care less about, a far more exciting product is already sitting on the shelves at the corner PC store.

Case in point: The Digital Bayou at last year's SIGGRAPH convention in New Orleans was filled with ambitious types, showing off virtual worlds brimming with primitive polygon avatars and running of machines that fell just short of Cray supercomputers. "Think of this as a virtual world," one developer patiently explained to me. "Everything has dimension. See... as I walk around this cube, the edges shift in 3D. And all the computer-generated characters have AI that generates predetermined behaviors." This pathetic demonstration of "cutting-edge" technology was running on an SGI Onyx the size of my first apartment's refrigerator.

Out on the show floor, someone had got smart and loaded *Quake* onto one of the IBM machines in their booth. A crowd was gathered around it ohhing and ahhing. "Can you turn around?" "Can you look up and down?" "Can you go up those stairs?" "What *is* this software?" It's *Quake*, it sells for $39.95 at CompUSA, and it runs on your Pentium.

Mark Rein of Epic MegaGames was in the bootLab the other day showing off *Unreal* on our MMX machines. I never imagined a game could look so real. And guess what? You'll be able to run it on the PC sitting on your desk at home. Software such as *Unreal* demonstrates the undeniable impact reality has on technology.

Meanwhile, be sure to catch cyber-pundit Howard Rheingold's commercial on TV, the one where he's telling you the key to the future is at Kinko's Copy centers.

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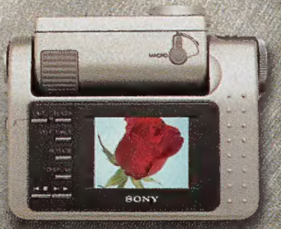

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LETTERS TO THE EDITORS

How Swede it is

I don't like your magazine... I love it!

I'm living in Sweden and I guess we have about 20 to 30 computer magazines here. I read five or six of them each month and I'd never realized how boring they are... until now! I can't figure out how I could have been reading so many magazines that test 27 hard drives every month and tell you how to format text in *Word* in every issue.

I want to get thrilled and excited when I read a magazine. You do that to me! Thank you for an excellent magazine! It has content from the first 'til the last page! It makes me wanna spend more and more money (I hate you for that) upgrading my system. You guys (and girls) are number one and I will buy every issue from now on (even though it costs about $18 here).

Leif Ottosson

I can dream, can't I?

I want to know what's new with PCs, even though I may not always be able to afford the latest technology. You guys keep everything in perspective. I may be a poor college student running a 486, but you keep me dreaming of great things.

Right now, I'm looking for a 64-bit 3D card that's quick in DOS and Win95, can do 1280x1024 with 16.7 million colors with MPEG, and has 2D acceleration built in. What do you recommend?

Bill Betoglou

Editor in Chief Brad Dosland replies: *We're looking for a single card that does all that too! In the meantime, try pairing up any of the 3Dfx-powered accelerators with Matrox's Millennium loaded down with WRAM.*

Veteran of the night

boot is one of my favorite magazines, and for someone who's married to his computer like me, reading *boot* is truly an experience.

I just have to comment on Bernard Yee's short review of my favorite game, *Neverwinter Nights*. ("WorldWide War," *boot* 04). True, the game is one of the oldest around (almost six years old!) and it has some of the oldest graphics, but let me give you the perspective of a veteran *NWN* player.

This game is one of the more robust multiplayer games out there. It's as "perfect" as any player could want. Latency has little effect... the game crashes only once in a blue moon. With more than 1,000 loyal *NWN* gamers out there, every night the game reaches maximum capacity with hundreds more waiting to get in. How many other games let you role-play with 500 people?

No matter how many webs you find on this game, there won't be any game on the web that can match its gameplay, versatility, or complexity.

David

Editor in Chief Brad Dosland replies: *You're preaching to the choir. We agree, David. That's why we deemed* NWN *one of the 10 best multiplayer games of all time. Its age only confirms it as a classic.*

Quality is priority one

I am looking for the best 21-inch monitor for games/multimedia. Super graphics and color are of utmost importance, while price is a secondary concern. I was hoping you could point me in the right direction. Is dot pitch more important than refresh rate?

Manfred Hubele

> "I'm looking for a 64-bit 3D card... [that] can do 1280x1024 with 16.7 million colors with MPEG... and 2D acceleration built in."

Senior Editor Mike Brown replies: *We've been looking at 21-inch monitors, too. Check out bootWorthy in boot 05 for a roundup of what we consider the best.*

For multimedia, a high refresh rate is more important than an ultrahigh resolution. Most games won't take advantage of a 21-inch monitor's ability to resolve 1600x1200 pixels, but they all look spectacular splashed across expansive video real estate.

If money is no object, Eizo's (formerly Nanao) FlexScan FX2-21 ($3,185) is probably the top of the heap, boasting a refresh rate of 80Hz at 1600x1200.

Mitsubishi's new Diamond Pro 91TXM is a great buy at $1,699, and consumes less desk space than other monitors we've seen.

The check's in the mail...

I just read the "WorldWide War" feature in *boot* 04 and I'd like to correct an error.

The article states that *Duke Nukem 3D* is available for play across DWANGO, which is true (against TEN's and Apogee's wishes, as was correctly stated). However, the article mentioned: "And DWANGO's paying royalties to Apogee anyway."

Oh really?! <g>

When is the first check going to arrive? :)

Anyway, my point is that no such arrangement was made between Apogee and DWANGO, and I don't think DWANGO is going to be nice enough to start sending us checks out of the blue.

Otherwise, another exceptional issue—I have enjoyed them all.

Scott Miller
President
Apogee Software, Ltd.

Get a Grip

I just picked up a Gravis GamePad Pro last week and your review in *boot* 04 is right on. But I have had one problem. The Win95 GrIP software conflicts with the dial-up network and I can't log onto the Internet when the Gravis software is installed. Until they fix this known bug, I'm limited to using it in DOS or as a standard game pad in Win95.

Tom Smith

Could you guys do a review/comparison of joysticks and game pads? I'm in the market for a really kick-ass controller. I went and bought Microsoft's SideWinder, but when I got home, I read the latest issue. It said the SideWinder was neat and all, but it's really just for Win95 games. That's no good for me because most of the awesome games I play are for DOS, so I returned the SideWinder.

I saw your review of the SpaceOrb 360 (*boot* 03) and I'm thinking about getting one of those. I was also tempted to buy the Microsoft SideWinder 3D Pro but I have not yet read any reviews of it. Please shed light on this subject. I trust *boot*'s opinions. You guys really know what you're doing!

Joel Gavino

News Editor Bryan Del Rizzo replies: *I hope you've had a chance to check out our game pad roundup in* boot *04 (there's a game pad review in the 05 issue too).*

The SideWinder pad looks and feels great, but it won't work in DOS, and the programming interface leaves something to be desired. The SpaceOrb 360 is a great controller for 3D action games, but it won't replace your traditional pad for sports games or side-scrollers. Until Microsoft decides to release an updated software interface for the SideWinder, I'd check out either the Gravis GamePad Pro or ThrustMaster's Phazer Pad. Both are programmable, digital, and support multiplayer gaming. The GamePad Pro is also compatible with GrIP supported games including EA's great sports sims.

By the way, if you haven't already done so, download the new GrIP software from ***www.gravis.com*** *and look for a controller roundup this summer.*

Online feedback

I've never sent an e-mail to a magazine before. But I just read Shel Kimen's On The Line column in *boot* 03, "There's No Place Like Home," and lately I've been kinda worried that I spend too much time on my computer.

I thought it was pretty keen how you put it: *X-Files* comes on, I leave my 17-inch Sony monitor; then type, chat, code, surf, download pictures of naked people. Ha! It's almost exactly what I do. The only other things that make me leave my machine are food and hanging out with friends. I guess this ritual sums it up for everybody.

After I click "send" on *Eudora*, I'll probably regret doing something as geeky as this.

ivo

▶ 11

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Product Information Number 111

Sloooowly I turned...

boot is the only mag I've ever subscribed to. After reading issue 01, I knew I had to get it every month. I want to know what the scariest chipset is, the fastest CPU, the best RAM for games, etc.

BTW, what's the story on the Klamath?! I sold my 486 months ago and am waiting for P-Pro with MMX (and its *killing* me!). I will *not* buy a computer now, not with MMX, AGP, SDRAM support, USB, new BUS protocols, etc. around the corner. The Klamath is *rumored* to be available in February, even though the AGP chipset (440LX) won't be out until the 2nd half of '97 :(

Hey, maybe some other company will realize there are a lot of people waiting for this new technology and beat Intel to the market. (There's already a VIA Apollo chipset for the P6 that looks very promising.)

John L. Morgan

Reviews Editor Andrew Sanchez replies: *I've just returned from a briefing at Intel and here's the scoop: Klamath will be available in the first half of 1997 to OEMs—the exact date is not known. But you won't see Klamath-based systems until sometime in the fourth quarter of 1997. And guess what? Klamath will require a new motherboard (no Socket 8 allowed).*

Check out next month's preview of Intel's new technology for the complete 411.

"... boot is the ultimate tech-weenie porno mag... one request: a centerfold!"

Pilot tip

They should give the USR Pilot an Academy/Emmy/Grammy award for best production! I hope everyone in your office gets a Pilot as a Christmas present.

Tip: Use a piece of scotch tape over the alpha/numeric pad area on the touchscreen. It does a great job of protecting the screen!

Christopher Powell

Future Schrock

"The consumer has moved to the leading edge," (from the Lip interview with Compaq's Rod Schrock in *boot* 04).

Unfortunately, Compaq hasn't.

After spending four hours trying to get a friend's Compaq 4172 to work, I gave up and told him "good luck." This 24MB system, when booted to Win95, has 3MB remaining for applications. Even launching Notepad causes massive disk thrashing. The Phone-Answering software has an 8MB executable, and when loaded (which takes more than a minute), consumes 13MB of system RAM. The Compaq Frontend software—for those too stupid to use Win95—uses another 8MB. Compaq charges $35 for a single tech support call to help you uninstalling the useless front-end and phone answering system. Since the system does not come with any system disks, or CD-ROMs containing device drivers, I was being cautious.

Benchmarking this system with various games showed scores similar to a well-designed P100. The included copy of *Magic Carpet* ran at a similar frame rate to my aging, hand-built P90.

Is this the leading edge of consumer-oriented systems?

I hope not.

Ian Firth

Bring on the 3D

Why does *boot* kick ass? Because it has the coolest stuff I've ever seen! Who wants to read a 10-page review about some stupid printers in one of those other mags?! Bring on the 3D accelerators, my friend!! HAHAHA!

By the way, I have a Matrox Millennium with 4MB, and I'm looking into getting either the Orchid Righteous 3D or the Diamond Monster 3D to go with it. I was going to sell the Millennium and get a cheaper 2D accelerator to cut down the price, but now the Millennium's price has changed from $500 to $250!

How does the STB Lightspeed's 2D compare with the Millennium? Also, has the price gone down for any of the Voodoo cards? It seems insane that the new 2D/3D cards are priced $100 cheaper than the 3D-only cards!

Roger Matthews

Tech Editor Chris Dunphy replies: *The STB Lightspeed's one hell of a card, but it's probably not worth selling your Millennium to get it. The Lightspeed has an edge in DOS performance; the Millennium wins out in Windows at higher res and color depth. You pay a price to get the horsepower of a Voodoo chip, and that price has not dropped. But the new Voodoo Rush chipset (see the Comdex coverage on page 21) will be out soon in cards from Hercules and other manufacturers. The Voodoo Rush is the Voodoo re-engineered to live on the same card with a 2D-only accelerator, sharing frame buffer memory. Voodoo Rush cards should cost the same as Voodoo-only cards cost now, which is about $300.*

Coming next month...

The verdict is out: Most of my co-workers agree that *boot* is the ultimate tech-weenie porno mag...

We just have one request: a centerfold!

Peter Nitz

Like comparing a Dodge Viper to a Dodge Neon

Would the STB Lightspeed 128 be *that* much of a performance gain for my S3 Trio32/64 PCI (with 1MB) on the motherboard? I enjoy playing *Quake*, *Duke Nukem 3D*, *NHL '97* (which runs *slow*).

George

Tech Editor Chris Dunphy replies: *Yes, particularly since a 64-bit graphics card coupled with only 1MB of memory is running crippled with only 32 bits of bandwidth into memory.*

Be aware, however, that CPU speed will have a large effect on performance too—don't expect a new graphics card to work miracles.

Is that a bribe?

Do you plan on reviewing motherboards? I would pay twice as much for your magazine if you included motherboard reviews.

Rex Nebula

Editor in Chief Brad Dosland replies: *We have no plans to include motherboards in boot's reviews section on a regular basis, but we do have some extensive motherboard coverage planned, including a 12-Step Motherboard Makeover next month and a bootWorthy collection of the best motherboards in the June issue.*

But, if some particularly sexy MB comes our way, it could very well find its way into the reviews section.

As the world turns...

Last May we bought a P100, with 16MB RAM, 1GB hard drive, 28.8Kbps modem, and a 4x CD-ROM drive. Now, just a few months later, the standard is 200MHz processors, 32MB RAM, 2GB hard drives, 33.6 modems, and 8x CD-ROM drives. Not to mention 3D accelerator chips.

It seems that in just six months our "new" computer has become old garbage. Is it already time to upgrade?

Brandon DeSantiago

Editor in Chief Brad Dosland replies: *Don't feel pressured to keep up with the industry-designated Joneses. If your current set up suits you, stick with it. If you're frustrated because you can't get every bell and whistle out of the latest software, bite the bullet and prepare to upgrade annually.*

Reader Sneedback

boot rules above every other magazine. And another thing... to Caesar Snee (CommPort, *boot* 05): YOU SUCK! as Duke would put it. If you don't like the magazine, then don't get a subscription...

Keep the reviews on the hot *new* stuff, not old 486 crap. In other words, do the opposite of what Caesar Snee says. Power to ya!

Chris Huseman

Cut, Copy, Paste

In the Force Feedback preview (boot *04), we stated that Immersion Corp. had plans to produce a force-feedback joystick of their own. Immersion claims they are licensing the technology and API only, and have no plans to manufacture the product. Check out* ***www.immerse.com/WWWpages/ff_joystick_prices.html***

We inadvertently neglected to credit ***Janell Umemoto*** *for creating the Lust-o-Matic that appeared in* boot *04. Thanks Janell!*

e-mail: commport@bootnet.com
fax: 415.468.4686
paper: boot commport,
150 North Hill Dr., Brisbane, CA 94005

Captain Mathis says,
"Never roll a plane with people in the back."

KIDS TO ADULTS K-A CONTENT RATED BY ESRB

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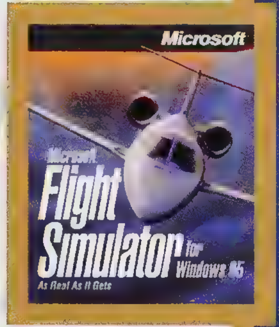
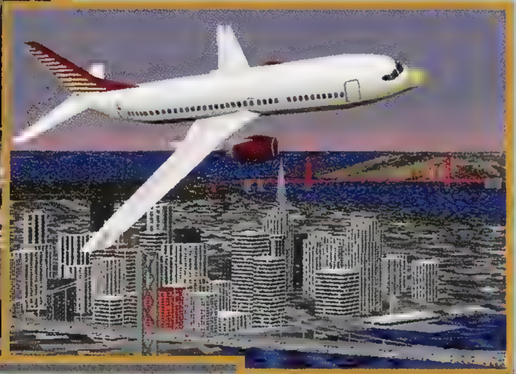
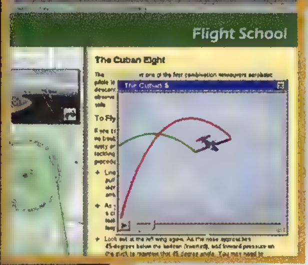
Captain Mathis knows how the love of flight can take hold and make you want to roll your plane, he just feels it's best to save stunt flying for your Extra 300S aerobatics plane.



The sensation of piloting your own aircraft is now attainable in the time it takes to pop in a CD and click a few buttons. The Microsoft® Flight Simulator for Windows® 95 intuitive interface, flying lessons by a virtual pilot instructor, and multimedia demonstrations get you up and flying your first time at the controls. Master flying basics and then, after logging some time, take on some of the more advanced challenges in any of the six planes in your fleet.





You'll soon come to believe that the Golden Gate Bridge was erected just so you could loop around it. Take off from Paris in your commercial Boeing 737-400; instruct your passengers to look out the left side of the plane to see the gardens at the Palace of Versailles. Or take your private Learjet 35A to Vegas; read the marquees on The Strip before landing. Microsoft Flight Simulator for Windows 95 graphics gives you geographical and scenic detail just that vivid (assuming you're not flying into a fog bank).

To view a 60-second sample video of true simulator flight that's as real as it gets, buzz us at www.microsoft.com/games/fltsim/

Microsoft
Where do you want to go today?®

Expansion Pack with southern California scenery, challenges, and adventures available soon.

Microsoft
Expansion Pack

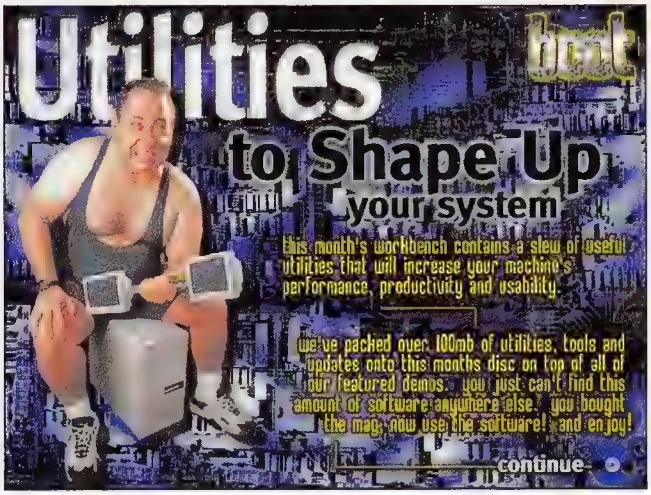
boot DISC

The *bootDisc* is compatible with both Windows 95 and 3.x. Run start95.exe to launch under Win95, and start31.exe under Win3.1. *boot* recommends a Pentium 90 or better with 16MB for access to all the software that's included.

welcome

to the Sixth Edition of the bodacious bootDisc!

Every month, ***boot*** magazine delivers 600+MB of the hottest software and exclusive demos. If it piques your interest in the magazine look for the ***bootDisc*** logo, and you'll find the fattest demos and coolest apps to complement our cutting-edge previews, reviews, and features. Slam the ***bootDisc*** into your CD-ROM drive to give yourself an injection of **Pure PC Power**.



Utilities to Shape Up your system

this month's workbench contains a slew of useful utilities that will increase your machine's performance, productivity and usability.

we've packed over 100mb of utilities, tools and updates onto this months disc on top of all of our featured demos. you just can't find this amount of software anywhere else. you bought the mag, now use the software! and enjoy!

Feature: Utilities to Shape Up Your System

This month's Workbench contains more than 100MB of utilities, tools, and updates to complement our System Shape Up feature. This page links you to it.

boot
List
Desc
Special
Launch Application
Back

Rocket Jockey
List
Description
ROCKET JOCKEY
Launch Demo
Special Instructions
Display
Back

Demos

We know what you power-hungry PC users really want, so we've got huge demos that aren't available for download from any web site; the most innovative apps; and special sneak peeks of things to come. Plus the new streamlined interface allows more intuitive access to the demos.

Workbench

We brought back the Workbench and temporarily turned it into a Juicebar to serve up all the cool utilities mentioned in the System Shape Up feature. We've divided it all up into seven categories, accessible from the buttons across the top. Dig in.

check out boot on the web

http://www.bootnet.com

bootNet sports many of the exciting **features** that make ***boot*** magazine such a valuable resource for the hardcore **PC** enthusiast. There are **reviews** and previews, **bootWorthy products**, and an expanding archive of *boot* **articles** from past **issues** online for easy reference, **complete** with a search engine.

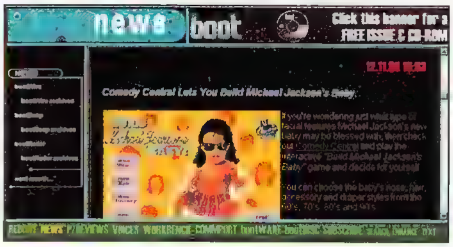
Want a second opinion before plunking down $500 on that snazzy new PDA, or just want to drool over the latest technology that no mere mortal could afford? Come check it out and follow the links for more detailed info!

Of course all this cutting-edge technology comes at a price: You'll need a JavaScript and Frames-capable browser (we recommend Netscape *Navigator* v3.0); a minimum screen resolution of 800x600; and 16-bit color for optimal viewing. The site is graphics intensive, and you'd be wise to view it with something *faster* than a 28.8Kbps modem if at all possible—now's a good time to get that ISDN line.

If you're always climbing to the pinnacle of the fast-paced tech world, you probably have access to these basics; if you're standing still, get your boots on!

NEWS:

bootWire features the latest news; bootDeep gives you in-depth analysis of the key stories broken on the bootWire; and bootRadar picks up the latest cool PC products appearing on the horizon.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Comedy Central Lets You Build Michael Jackson's Baby

If you're wondering just what type of facial features Michael Jackson's new baby may be blessed with, then check out Comedy Central and play the interactive "Build Michael Jackson's Baby" game and decide for yourself.

You can choose the baby's nose, hair, accessory and diaper styles from the 60's, 70's, 80's and 90's.

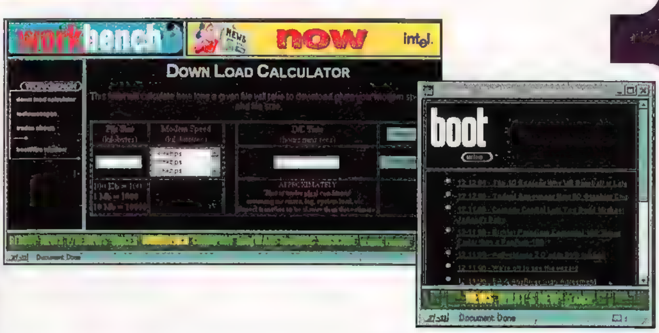
p/reviews
Find out how you ... this space!
REBOOT NEWS P/REVIEWS VOICES WORKBENCH COMMPORT bootWARE bootDISC SUBSCRIBE SEARCH ONLINE TXT

P/REVIEWS:

Here you'll find no-bunk reviews and advanced previews of all the PC hardware and software you care about.

WORKBENCH:

A collection of useful tools to aid in navigating the web.


workbench
NEWS NOW
intel.
DOWN LOAD CALCULATOR
File Size (kilobytes)
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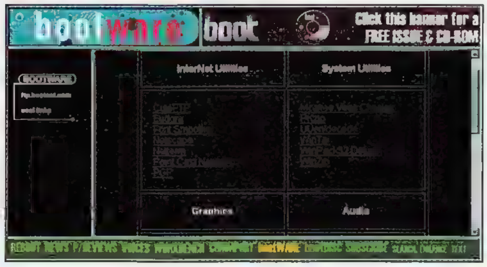
boot
Document: Done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Want to contact us? We want to hear from you. This section is the most interactive part of *boot*'s web site. It has letters to the editor, and a profiles section introducing our staff. Plus a list of advertisers' links so you can find out more about their products.

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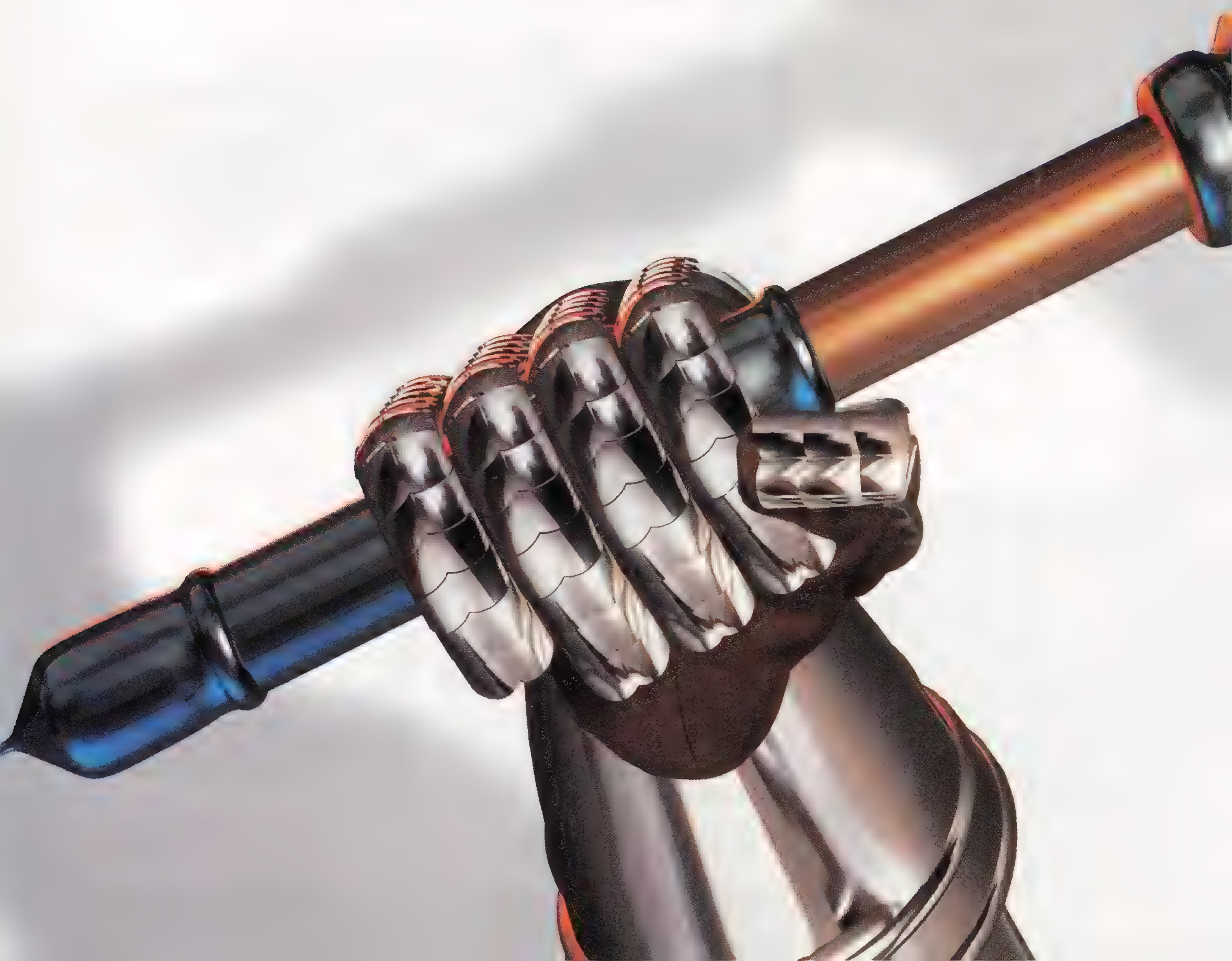
bootWARE:

Get your grubby lil' hands on the latest downloadable drivers, patches, and coolest demos around.

VOICES:

Columns by *boot*'s connected writers, a few words from our editor, and some special guest contributions.

FOR A FREE DEMONSTRATION OF OUR 3-D GAMING EXPERIENCE,
SLAM THIS MAGAZINE INTO YOUR FACE.



THE ULTIMATE GAMER PC. NOW FEATURING PENTIUM® PROCESSOR WITH MMX™ TECHNOLOGY.

At NEC, our gaming PCs have just taken on a whole new dimension. The third, to be exact. With two dedicated 3-D graphic accelerators and the revolutionary MMX technology, the NEC PowerPlayer™ sucks you right into the action.

200MHz Pentium Processor with MMX technology

Diamond Monster 3-D and ATI 3-D Rage graphic accelerators

32MB RAM/4.0 Gigabyte HD

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And don't worry, you'll be armed with everything a serious gamer could ask for. A 200MHz Pentium processor with MMX technology, 6MB of video memory, and a 50-watt Advent sound system with Creative Labs' new AWE32 sound card. We've also thrown in two Microsoft® Sidewinder™ game pads, a Thrustmaster® Top Gun™ Joystick, and a Logitech 3-button Mouseman® mouse. As well as a bunch of today's hottest games, all reconfigured to take advantage of our unique 3-D technology. You can even head out into cyberspace and play in real time against anyone else on the net.

POWERPLAYER

For more information, call 1-800-NEC-INFO. Or, for a slightly more conventional demonstration, visit your local retailer. Available at Circuit City, CompUSA, Future Shop and Fry's.

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Key #19877

MOVIES
We Don't Want to See Made Into Computer Games

Tap

Try to win big money by entering tap dance contests. You control the contestant by manipulating the toes, heel, legs, arms, and hands using the keyboard or game pad.

Friends—the CD-ROM Game

You can choose to play as any one of the six characters from the smash hit television show. Your mission? Survive the daily perils of New York City living. You'll have to avoid nasty landlords; spy on naked, ugly men; hail taxicabs; or date whiny, obnoxious people. A slice of life!

Andy Warhol's "Sleep"

Screen saver/game with video footage of a man sleeping for eight hours. The game portion lets you try to wake him up. If you can keep him awake, you'll score big.

The Piano

Piano instructional software. For every lesson you complete, a small piece of Harvey Keitel's naked butt is revealed.

Forrest Gump: The Text Adventure

You are standing on a street. A wooden bench lies to the north.

```
>GO NORTH
```

You see a wooden bench.

```
>SIT ON BENCH
```

You are now sitting on the bench. A woman sits down next to you.

```
>INVENTORY
```

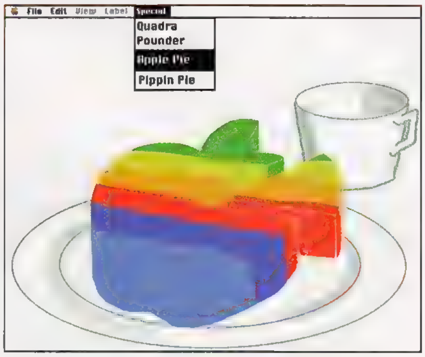
You are carrying:
A box of chocolates

QuickTime Service —15 Minutes or It's Free

Apple Computer plans to open a chain of cyber-themed restaurants called the "Apple Café." The first café is slated to open in Los Angeles in late 1997 and future sites may include London, Paris, Tokyo, and Sydney.

Each café will encompass up to 15,000 square feet and accommodate upwards of 250 people. The cafés will feature leading-edge Apple technology, with emphasis placed on multimedia and the Internet. From every table, guests can order food, sample CD-ROMs, browse the Internet, and most importantly, video conference with "guests" dining at other tables across the United States or around the world.

Possible tantalizing menu selections include the Quadra Pounder with Cheese, Pippin Pie a la Be, and Coca-Copland on tap.



According to an inside source at Microsoft, Bill Gates has plans to acquire his own restaurant chains and fast food drive-throughs, including Microsoft McDonalds, WinWendys, and Jack in the Bob. Let the food wars begin!

Stupid is as Stupid Does

CHILDREN'S IQ TEST AND ACHIEVEMENT
GRADES K-3
GRADES 7-9

The *Children's IQ and Achievement Test* from Virtual Knowledge, offers aptitude and achievement testing of children from Kindergarten through Grade 9, based on the long standing American School Psycho-Educational Assessment Batteries.

Engaging, age-appropriate characters administer the test, with minimal parent involvement. Parents receive completed printed reports as well as on-screen reports containing analysis of the scores. Parents can track their kid's progress from year to year, and help educate their children by playing challenging games and activities included with the software.

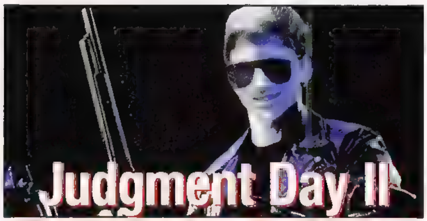
The Parents' IQ and Achievement Test and Magazine Editor's IQ and Achievement Test, will be available soon.

Konami Who?

Konami (America) Inc., recently sent out press releases announcing its change of name to Konami of America Inc. In addition, the company offered private counseling for anyone confused by this major move.

Computer Terminology —What Do They All Mean?

PCMCIA	People Can't Memorize Computer Industry Acronyms
ISDN	It Still Does Nothing
APPLE	Arrogance Produces Profit-Losing Entity
SCSI	System Can't See It
DOS	Defunct Operating System
BASIC	Bill's Attempt to Seize Industry Control
IBM	I Blame Microsoft
DEC	Do Expect Cuts
CD-ROM	Consumer Device, Rendered Obsolete in Months
OS/2	Obsolete Soon, Too
WWW	World Wide Wait
MACINTOSH	Most Applications Crash; If Not, The Operating System Hangs



Judgment Day II
The Gathering Postponed

In what has become an annual event for Microsoft, Judgment Day II has been postponed until later this year to coincide with the Computer Game Developers' Conference in Santa Clara, Calif. In the past, Judgment Day has served as a showcase of top game companies/developers, featuring exciting entertainment and cutting-edge technology.

pod™
DOLBY SURROUND
Designed for Windows® 95

Start your engines and get ready for the FIRST Multi-Player Racing Game directly playable over the Internet ...coming at you April 1st.

...POD is the fastest, hypersonic, nitro-burning, neck-jerking, nail-biting, explosive futuristic game ever that exploits the latest cutting edge technologies...

- Incorporates state-of-the art MMX™ technology (Pentium® processor compatible*)
- Mix and Match multi-player options (Up to eight direct player connection over the Internet, local network or modem; two computer direct link connection, and two player split screen option.)
- Unprecedented speed...playable at up to 30 frames per second!
- Pre-calculated position engineering eliminates latency!
- Revolutionary website includes player matching, chat rooms, ranking lists, downloadable and upload able ghosts, tracks, and cars, customizable web pages for every player ...and more.

Be ready for it or get out of the way.

Shareware available soon.
Check it out at: www.ubisoft.com

Ubi Soft
ENTERTAINMENT

*Package contains one "hybrid" CD-ROM disc containing POD optimized for Pentium® processors with MMX™ technology, as well as Pentium® processors, 120 MHz or higher.

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Product Information Number 332

THE WORLDWIDE

REPORTER

$ 1.39/ $ 1.69 Canada

My Mail Was Lost—IN SPACE!

SHOCKING PHOTOS INSIDE!

Mineola mailman mind-melds with 30-legged space worm to save happy hour crowd from crazed killer!

MINEOLA, NY—Lucky Long Islander Pat Harris has encountered plenty of killer dogs on his postal route over the years, but never any killer space aliens—until now! **"I was just minding my own business,** delivering Mrs. Panayatocopoulos' mail when these space guys ask me if I want to go for a ride." Suddenly, Harris was transported to a bizarre bar full of creepy-crawly space critters! Then the wacky E.T.'s made Harris enter the minds of space port bar patrons—including a man-sized worm thing—to retrieve clues that ultimately led space police to a shapeshifting serial killer! Sadly, after returning from the minds of various insect-like aliens, Harris is left with a life-long legacy of flashbacks that cause him to eat maggots and simulate molting. But for Harris, it's a small price to pay for intergalactic glory!

"I want to go back to Armpit VI. There, I'm an intergalactic hero. But here, I'm just another disgruntled mailman that's been abducted by aliens," reveals sentimental galaxy-trotter Harris.

In a strange twist of fate, the mail Harris was supposed to deliver to **Steve Meretzky—creator of "The Space Bar,"** "The Hitchhiker's Guide to the Galaxy" and numerous other science fiction games—ended up in the "hands" of a wide-eyed resident of planet Armpit VI.

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THE SPACE BAR™

Just another CD-ROM game where you're a psychic gumshoe detective trying to solve a murder by mind-melding with drunken aliens.

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Product Information Number 305

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Designed for Microsoft® Windows®95

Mac OS

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RATING PENDING RP CONTENT RATED BY ESRB

PHOTO: COMDEX Daily Online

With more than 7,000 exhibitors and 200,000 attendees, Fall Comdex was a madhouse.

Comdex Highlights

The bootStaff goes to hardware heaven

Comdex: The trade show people love to hate. This year's fall show was as massive as ever, with more than 7,000 exhibitors and 200,000 attendees.

But the most notable aspect of Fall Comdex was how quietly exhibitors were handling MMX technology. Intel wouldn't allow manufacturers to announce MMX products, fearing consumers wouldn't buy existing PCs during the big holiday shopping season.

Handheld computers, on the other hand, were a big hit. More than a dozen manufacturers were showing new models and many were running Microsoft's new CE (Consumer Electronics) operating system. Check out this month's bootWorthy for more information.

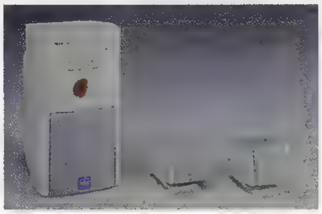
Here's the rundown on some of the significant product announcements made at the show. (Log onto **www.bootnet. com** for information about how to contact these companies.)

The Sound of Things to Come

Yamaha unveiled a new three-piece speaker system, which it expects to ship in March. The System 25 ($129) will feature two magnetically-shielded mini-satellites with two-inch drivers, and a magnetically-shielded subwoofer with a five-inch driver.

The amp in the System 25 will deliver five watts per channel to the satellites, and 15 watts to the subwoofer. A volume control and power switch on the right satellite will control the entire system, eliminating the need to reach under your desk to adjust the overall volume or change the amount of bass. If you're looking to upgrade an existing speaker system, Yamaha will also sell the YST-MSW5 subwoofer separately.

Altec Lansing, meanwhile, announced a new three-piece speaker system with USB capabilities. Altec's USB46 speakers ($149) will feature an embedded Intel 80930AE chip, which will allow digital audio to stream directly to the speaker, instead of being converted to an analog signal on the host computer and then output to the speakers. It remains to be seen what real benefit there is in moving the DAC into the speakers.



Yamaha's System 25 speakers feature a pair of two-inch full-range drivers and a five-inch subwoofer in magnetically-shielded enclosures.

The USB46 will feature a pair of magnetically-shielded satellite speakers (three-inch drivers) delivering six watts per channel, accompanied by a 20-watt subwoofer with a four-inch, long-throw woofer.

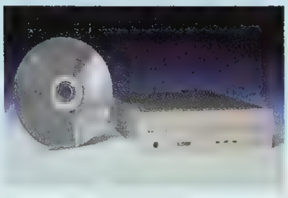
DVD Is Here

With copy-protection problems finally settled, there were a flurry of DVD product announcements at Comdex. Toshiba joined Panasonic, Pioneer, and other manufacturers in announcing their intention to ship DVD-ROM drives to OEMs beginning in December '96.

Meanwhile, Panasonic, Diamond Multimedia, and Creative Labs all announced DVD-ROM upgrade kits. Diamond promises to be first, shipping their kit by mid-December, but they wouldn't commit to pricing. Creative Labs is pricing their kit at $499, but would only commit to shipping a product in the first quarter of '97.

Upgrade kits will consist of a DVD-ROM drive, a controller card with MPEG-2 and Dolby AC-3 decoders, and a few software titles. Tsunami was the first game developer to announce a DVD game, but it's just an MPEG-2 version of their interactive movie *Silent Steel*.

In other DVD news, CompCore Multimedia announced a pair of MPEG-2/AC-3 decoder products. *SoftDVD* is an all-software decoder that will work with MMX-equipped Pentiums; while *Accelerated SoftDVD* will function with older Pentiums that have hardware-based MPEG-2/AC-3 decoders installed.



Panasonic will be among the first to ship DVD-ROM drives.

DUAL 200 MHz
PENTIUM PRO

Dolch unveiled their PAC-Pro portable computer, packing dual 200MHz Pentium Pros and a 12.1-inch LCD capable of 1024x768 resolution.

Packin' Power

Just how much power can you pack into a portable computer? Dolch Computer Systems announced a new lunch-bucket-style portable equipped with *two* Pentium Pros running at 200MHz each.

This 20-pound monster would probably collapse an airline's tray table, but if you need power in the field, the ruggedized Dual PAC-Pro has plenty to spare. With no fewer than six SIMM slots, memory can be expanded from the standard 32MB all the way to 768MB. The 12.1-inch active matrix, flat panel SVGA display is a feast for the eyes, capable of 1024x768 resolution.

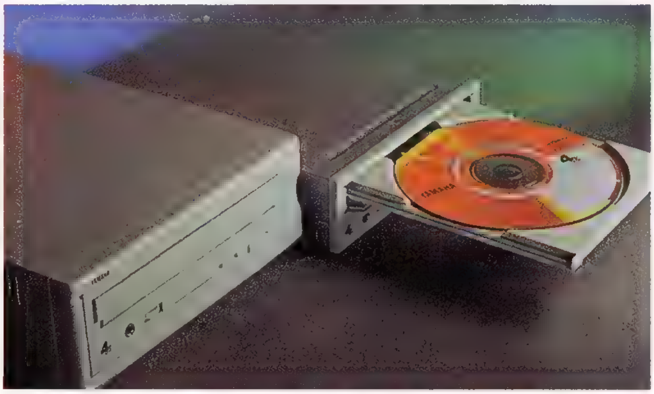
And if you're looking for an expandable portable, the PAC-Pro comes complete with five full-length PCI/ISA expansion slots.

CD-R Speeds Up

Yamaha Systems Technology announced the first CD-R drives capable of writing discs at 4x speed and reading them at 6x speed. Yamaha also announced it would be packaging its high-end drives for retail distribution for the first time. (Previously, Yamaha only sold drives to OEMs and distributors.)

Yamaha's CDR400, which will be available in February, will sell for $849. The drive will feature a 2MB buffer to prevent buffer underrun, and will be equipped with flash ROM for firmware upgrades. The drive will be available in both SCSI and IDE/ATAPI configurations; so if you don't have a SCSI controller card, you won't need to buy one just so you can use a CD-R. With support for both variable and fixed packet writing, you'll be able to write files to a CD just like you do to a floppy. The first drives Yamaha ships will be equipped with disc caddies, but the company promises to make both caddy and tray drives available soon.

Yamaha will also ship the CDR-200, which will feature 6x read, but only 2x write. This drive will retail for $549.



Yamaha's CDR400 will write to CD-R media at 4x speed, and read from CDs at 6x speed. Yamaha also announced it would be entering the retail channel for the first time.

Big screen plasma monitors are on their way. This 40-inch model from Mitsubishi looks particularly luscious.

Big and Thin

Video monitors are approaching gargantuan proportions. Mitsubishi, Fujitsu, and NEC all announced 40-inch models that are light enough and thin enough to be hung on the wall like a painting. Plasma monitor technology uses a sealed glass envelope filled with rows and columns of thousands of individual chambers. The chambers contain a mixture of neon and xenon gasses that glow when energized. Unlike LCD screens, plasma displays remain incredibly sharp and bright even when viewed extremely off-axis.

Mitsubishi's monitor offers resolution of 640x480, with a horizontal scanning range of 15kHz to 50kHz. Dot pitch seems high at 0.42mm horizontal x 1.26mm vertical, but these devices aren't designed for close work; they're designed for group presentations. Mitsubishi expects the first shipping units, which will be professional models available in April, to fetch between $10,000 and $12,000. Mitsubishi's consumer electronics unit, however, is expected to offer displays designed for video only that will be considerably less expensive.

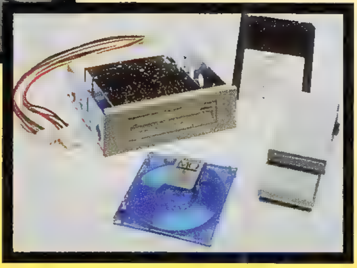
Mo' MO

Fujitsu Computer Products announced a new, higher capacity magneto-optical drive. The DynaMO 640 is a 3.5-inch MO drive capable of storing up to 640MB on a single disc. Fujitsu also announced an internal EIDE version of its 230MB MO drive.

The DynaMO 640 is an external drive with a Fast SCSI-2 interface. The drive is capable of reading and writing to previous MO standards, including 3.5-inch disks with 128, 230, and 540MB capacities. The drive is capable of a data transfer rate of 3.9MB/sec, with an average seek time of 35ms—much closer to hard-drive speed than previous optical storage technologies.

The DynaMO 640 has a list price of $659; the DynaMO 230 IDE sells for $375.

Fujitsu has boosted the maximum capacity of the magneto-optical drive to a whopping 640MB with their DynaMO 640.



The DynaMO 640 will also be available in an internal IDE-ATAPI configuration.

"Its the fastest laptop I've ever had"
From Byte Magazine,
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Re: Nimantics Orion

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From Byte Magazine,
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December 1996
Boot Magazine
RE: Nimantics Orion 166

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Boot Magazine
RE: Nimantics Orion 8X 200

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Boot Magazine
RE: Nimantics NX-Lite 133

NSTL Byte Magazine 4-Star Rating ★★★★
October 1996
Byte Magazine
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LAPTOP BUYERS GUIDE & HANDBOOK ★BEST BUY★
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- ✓ 1 MB Wavetable Sound
- ✓ Built-In 16.7 Million Color Hardware MPEG (with built in 16 bit FM Synthesizer Stereo Sound)
- ✓ Zoomed Video Card Socket
- ✓ 64 Bit PCI Bus Video with 2 MB Video RAM
- ✓ Fully PCI Bus Plug'n' Play System
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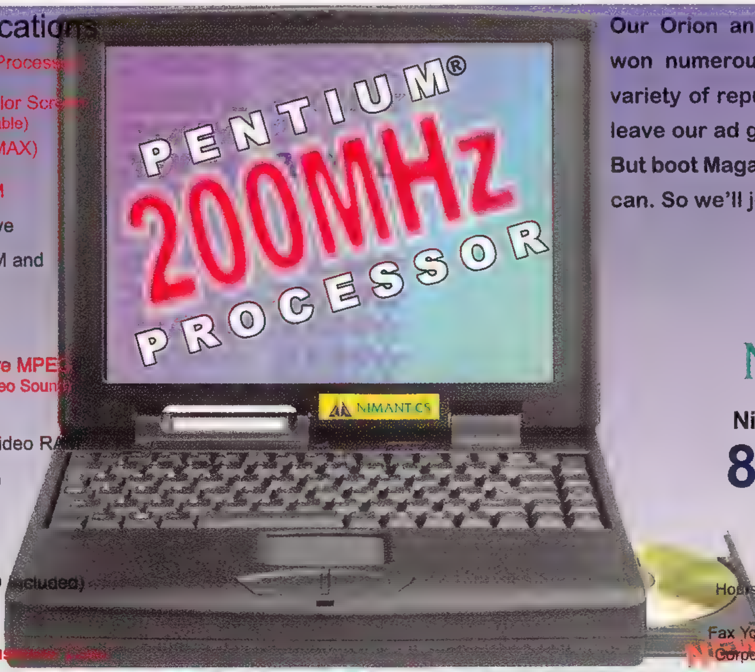

Our Orion and NX-Lite Series notebooks have won numerous accolades and awards from a variety of reputed PC publications. Awards that leave our ad guys to figure out clever headlines. But boot Magazine seems to say it better than we can. So we'll just let their words do the talking.

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Hot buns

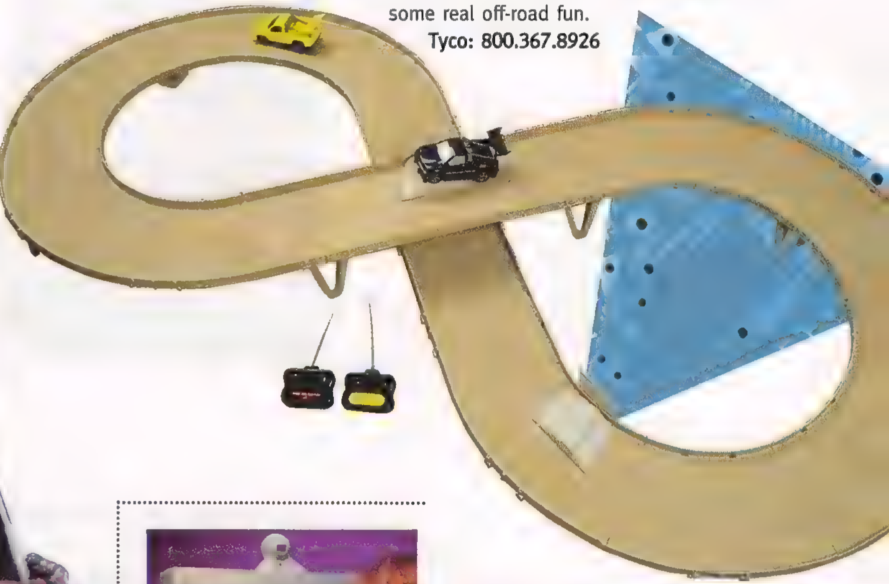
The ThermalWear Warm Seat will keep your butt warm—or cool—in any weather, using special Heat-Transfer Formula chemical packs. Plug the pad into any 12volt cigarette lighter or 110volt wall outlet and the unit heats up to 115°F in just 30 minutes. When summer comes, swap in the cooling packs and a refrigerator activates its cooling powers. The beauty of Exothermal Technology's products is that unlike gel or ice packs that tend to be either too hot or too cold immediately after preparation, Exothermal's packs maintain a "factory preset" temperature for up to six hours. The $99.95 Warm Seat is available in camouflage, safety orange, blue, or nuclear yellow.

Exothermal Technology: 800.991.5665; www.exothermal.com

Zoooooooom!

When I was a kid, race sets meant slot cars, control over speed, and maybe a loop-the-loop if you were really lucky. My, have things evolved. Tyco's Radio Control Mega Racing set features two 1/20 scale remote-control trucks and 6.75x3.25 feet of fat off-road-style track for $100. Each truck has seven radio-control functions and a two-speed gearbox, making for intense and immersive racing. You can even smash into your opponent's car! The 27MHz transmitters promise a minimum range of 15 feet. If you grow tired of the track circuit, you can take the trucks outside for some real off-road fun.

Tyco: 800.367.8926



Miros
CyberWatch

Who goes there?

Passwords can be hacked, faces can't. The TrueFace CyberWatch system uses patented software and any video camera to verify the identity of users when they attempt to access data from a server. In seconds, TrueFace snaps a photo, compares it to those stored in an image database, and authorizes or denies access. A neural network is the brains behind this biometric Big Brother, and it can't be tricked with a photo.

CyberWatch keeps face records for later review and can even check back periodically to make sure you don't pull a switch-a-roo. The TrueFace Cyberwatch Server includes client software and a monochrome Connectix camera for each of five computers. Prices start at $9,995 for a system based on 100 authorized users.

Miros: 617.235.0330; www.miros.com

Don't get up

CD-ROMs cluttering your desk? Check out Boffin's 8x CD-ROM jukebox that moves 28 discs between seven readers. That means you can switch from *Tomb Raider* to *Encarta* in less than five seconds! Each CD-ROM reader boasts a 1200K/sec data transfer rate, 150ms average access time, and a 256K buffer. For $4,999, the JB828 is available in either a stand-alone or rackmount configuration. It runs on both Netware and Windows NT, and is compatible with all the CD-ROM file formats.

Boffin Limited: 612.894.0595; www.boffin.com

compiled by David Pescovitz

Crank it

This box would have been handy on Gilligan's Island! BayGen's Freeplay Radio is powered by a small hand crank. Sixty seconds of manual labor generates enough energy for 40 minutes of playing time. Shortwave, medium wave, and FM come through crystal clear, and the durable plastic casing is perfect for those picnics in the bomb shelter. Crank away and this thing will keep going and going... long after the Energizer bunny runs out of fuel. And if you're just too lazy to crank, there's an optional AC jack. The Freeplay Radio costs $100, batteries not included—or needed.

BayGen: 800.946.3234

Who's calling?

Chronic pacers and paranoiacs will appreciate Sony's new SPP-ID910 cordless telephone. Combining digital 900MHz technology with Caller ID, this unit is a workhorse. The Caller ID/Call Waiting option will even inform you as to who's calling on the second line, so you don't have to risk rudeness every time a telemarketer beeps in. The speed dialer holds 20 numbers for quick connections. The phone weighs just 10 ounces with its battery, and delivers seven hours of talk time when fully charged. At $229.95, talk may not be cheap, but at least you can choose who to talk to.

Sony: 800.222.7669; www.sony.com

Wrist water bed

Mousing and keyboard pounding add up to the perfect recipe for a painful case of carpal tunnel syndrome. Case Logic's Gel-Eez gel-filled wrist rests help reduce your chance of injury by eliminating the pressure points commonly found in foam pads. They really do feel like a "water bed for your wrists," just as the company promises. If you're already a victim of wrist fatigue and your doctor has recommended cold therapy, toss the pad into the freezer for two hours. The pads range from $12.99 to $16.99 and are available in sizes appropriate for desktop keyboards, mice, and notebooks.

Case Logic: 800.447.4848; www.caselogic.com

Retina burn

Zenith Electronics is launching a new line of home-theater systems. The company promises its Inteq line will be Direct-View Entertainment Machines (that's TV to you and me). The top-of-the-line is the IQ6081 60-inch rear-screen projection system, with digital three-line comb filter processing to sharpen the image's details. Dolby Pro-Logic Surround Sound is standard with the big screen, along with the BBE High Definition Sound system. The BBE system fixes phase and amplitude distortion, compensating for the subtle fidelity loss present in all loudspeakers.

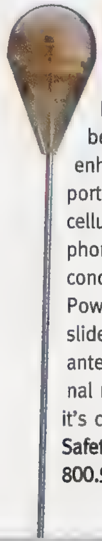
Even the Inteq remote is tricked out, with a track ball for point-and-click operation. The $4,299 TV's 16 rear jacks and four front jacks provide ample connection to any home-theater environment.

Zenith Electronics: 888.376.6825; www.inteqtv.com

Tickling the oscillators

Analog enthusiasts with digital desires will appreciate the booming bass and fat strings of the Clavia Nord Lead virtual analog synthesizer. You program the 49-note, velocity-sensitive keyboard using good old-fashioned knobs, instead of digital sliders and buttons. (Ahhhh... the nostalgia!) Two virtual analog oscillators—which use mathematical simulations of the electronic signal generated by analog oscillators—produce sawtooth, triangle, and variable-width pulse waves. The analog sounds can also be combined with or changed to FM-type sounds. Add two LFOs, a sample-and-hold arpeggiator, "Pitch Stick," modulation wheel, and MIDI, and you have a keyboard with old-school style *and* state-of-the-art compatibility. What's next, the return of Keith Emerson?

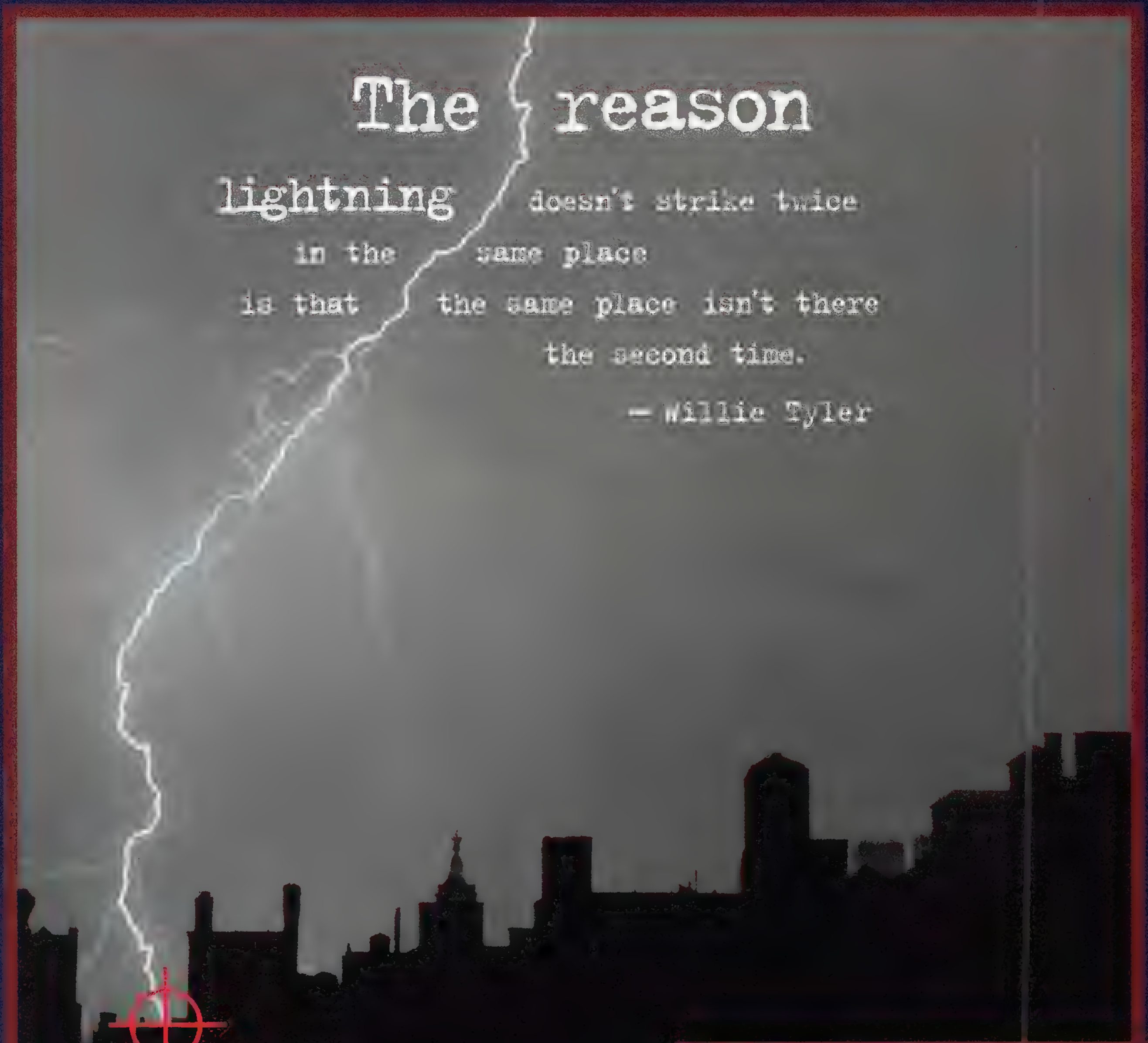
Available through Armadillo Enterprises: 813.796.8868; www.armadilloent.com/music



Power tip

Wireless reception problems? The Power Tip may not be pretty, but it does enhance reception of portable and car radios, cellular and cordless phones, and TVs. The concept is simple: The Power Tip's copper core slides onto your existing antenna and boosts signal reception. At $9.95, it's certainly worth a try.

Safety Zone: 800.999.3030


The reason
lightning doesn't strike twice
in the same place
is that the same place isn't there
the second time.
— Willie Tyler

Digital precision. Deadly accuracy.

Imagine scorching your enemies with razor-sharp precision. With the world's first digital-optical joystick, the SideWinder™ 3D Pro, you'll balance complex moves with maximum control to get the ultimate in responsive game play. You won't have to recalibrate, even after hours of play. And every handle rotation instantly changes your viewpoint. Digital Overdrive lets the joystick communicate more efficiently with your Windows® 95-based games. All the better to singe your competition.

SideWinder™
3D Pro

Microsoft

Where do you want to go today? www.microsoft.com/sidewinder/

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VAPOR WARS

THE LONG AND CONVOLUTED SAGA OF BATTLECRUISER 3000 AD

hype is a double-edged sword. And the longer it's sharpened, the more dangerous it is. No product has pushed this axiom as long and hard as *Battlecruiser 3000 AD*. It is legendary.

Vaporware classics such as *Champions, Superheroes, Darklands*, and *The 11th Hour* came and went, some actually being released, some just disappearing. But *Battlecruiser 3000 AD* (or "*BC3K*") was always there, a perennial trade show favorite, floating from one company to another while its proud papa, Dr. Derek Smart, continued to feed the hype machine.

Battlecruiser 3000 AD first appeared as a blip on the radar in 1992, when Dr. Smart started showing an early demo at trade shows. Smart, a charismatic lone-gun programmer, talked up the groundbreaking nature of his game to anyone and everyone who would listen. (He once announced to another developer, "I am the greatest programmer in the world.") In interview after interview, he spoke of creating the ultimate computer game: one with a real, living, dynamic universe to experience. A universe populated with planets, ships, and people that went about their actions with or without your intervention. A universe you could explore at will and which would react in an utterly realistic way, "learning" as it went.

The system would be based on "neural net" technology: an artificial intelligence that works independently and responds realistically to any situation which might arise, "thinking" for itself and learning how to make better decisions based on your input.

> "Few people have underestimated me and laughed about it. I hope you've learned a valuable lesson from all this. You only get *one* chance." —Dr. Derek Smart, *Battlecruiser 3000 AD* creator

By the Consumer Electronics Show in winter of 1993, 360 Pacific had picked it up as publisher, with a slated released date of April 1993. Rules and screen shots were sent to the press. The pub date came and went, 360 hit rocky waters, and by winter 1994 the project had been passed on to Mission Studios and Intracorp, with a ship date of March 1994. This date also came and went, and by December 1994 Take 2 Interactive had picked up the cursed project, planning to release it the following December. Other companies had their mits on this digital hot potato over this seven year stretch, but these are the major players.

Smart and Take 2 were now a team. He would create the AI and engine of *BC3K* and Take 2 would put a high polish on it, cleaning up the outdated graphics, putting it through QA, and producing the final product. Somewhere along the line, this process broke down.

To some, Smart was a perfectionist working hard to code a groundbreaking piece of software, and he would get it right at all costs, no matter the delays. A noble figure fighting the corporate money men. Or maybe he was a snake oil salesman, promising castles built on the clouds to increase his own fame and to milk money from publishers. This would make him a less-than-noble figure, scamming the industry and the gamers. Or maybe he was just an average guy with a good idea, who wanted to do it right but made promises he couldn't keep. Smart's volatile and quirky personality made it hard to determine the truth.

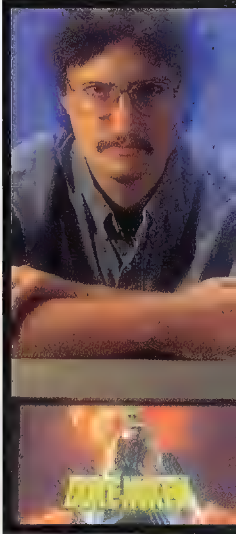
Take 2 was set to release *BC3K* by Christmas 1996, when Smart announced another delay, from December 1995 to January 1996, saying: "Take 2 didn't have a choice. It was my decision. Blame me. Before you know it, it will be January and I can go on that much-needed vacation—which you're gonna be paying for. Derek Smart's *Battlecruiser 3000 AD*: the last thing you will ever desire."

When *Battlecruiser 3000 AD* finally shipped last November, the most charitable thing you could call it was a "complete mess." It crashed constantly. It wouldn't play past the second mission. Objects passed through one another. The list of bugs fills several pages. In 10 years of evaluating software, I personally have never seen a published piece of software this unstable. It was Alpha quality. Worst of all, the complex game was rendered unusable by a dreadfully thin manual.

Then the shinola hit the fan.

It began on AOL where Smart laid all the blame on Take 2, claiming they were in violation of their contract, had released the wrong manual, and were guilty of a long list of sins. Take 2 President Mark Seremet replied that Smart had approved the manual. This enraged Smart.

"QUIT being an idiot Mark!" he responded in a public forum on AOL. "I've had ENOUGH of this crap! I NEVER signed off on anything. Who on this planet would believe that I would sign-off that piece of garbage knowing I took a HUGE royalty hit back in May so that I could get a 'professional manual' after the original garbage you guys printed back in Dec. of 1995... Someone's going to pay for this if it's the last thing I do. I spent seven years of my life on this game and I'm prepared to spend the next seven years doing this if it came to that. Take 2 is NOT equipped to handle a game of this scope—period... I was to develop the game, you were to publish it. THAT was the agreement."



"You gambled, lost, and are paying for it," Smart remarked as part of his 1,000 word retort. "Few people have underestimated me and laughed about it. I hope you've learned a valuable lesson from all this. You only get ONE chance."

The bitter recriminations continued for some time, but seem to have settled down for now as the team gets back to work. I'll have interviews with Take 2 and Dr. Smart in the next column, as we try to get to the bottom of what happened to *BC3K* and why. We'll also delve into the mysterious world of neural nets, whether they can be used in games, and whether there is actually one in *Battlecruiser 3000 AD*. ▮

T. LIAM MCDONALD is the all-knowing god of gaming. He also writes about computers, literature, and horror for numerous mags.

DROWNED GOD
CONSPIRACY OF THE AGES
LISTEN TO YOUR EARS
BAZOOKA

To create the perfect sound for Horus, the Drowned God™ sound designers blew through an eight-inch plastic straw into the studio toilet and recorded it with a condom-wrapped microphone.

Of course, if you had a Bazooka, you already heard that.

A Bazooka® MS8 multimedia subwoofer lets you hear things in the CD-ROM *Drowned God*™ you never heard [illegible] sweeping [illegible], heart-pounding lows you simply can't hear with ordinary computer speakers. Call 1-800-The-Tube for your nearest dealer, [illegible] the difference [illegible] enclosure makes. Then get ready for a subwoofer so amazing, you'll swear it was reverse [illegible]. In Canada, call: Trends Ele[illegible]

MS, [illegible], ®, and Listen To Your Ears are [illegible] Southern Audio Services Inc. [illegible] courtesy of EMG and Instance [illegible] and Instance. All [illegible]

Product Information Number 304

THE MYTH OF CYBERSPIRIT

BEWARE THE SIREN SONG OF THOSE WHO EVANGELIZE CYBERSPACE

On the eighth day, when the multi-user worlds are up and running, when everyone has a Pentium Pro and 3D graphics accelerators on their desktops, when streaming video pours through all our cable modems, we will be transcended into a collective consciousness. We will reap great rewards, uncover the philosopher's stone, and drink from the elixir; an alchemist's brew of 3D models, domain names, and a satisfied spirit.

Not only is all this improbable; it's an outright lie.

Let's not kid ourselves. The P-Pro on every desktop model is further away than we'd like to think, (unless we're only surveying the early adopters and inspired delegates of the middle class). And the elusive cable modem is just that: elusive. It's nonexistent as far as mainstream America is concerned. Even supposing the network PC, Java Station, or Nintendo64 could bring the Internet closer to the huddled masses, and even supposing cable modems rewire a backbone conveniently hooked into our living rooms; do we *really* expect spiritual transcendence?

CyberEvangelists propose just this: an out-of-body experience, Nirvana (the state of being, not the band), consistent spirituality, and ever-lasting (and fulfilling) community. Last November, I attended a conference held just outside Las Vegas. All the usual suspects from artsy/academic circles were gathered to speak and listen (probably more of the former). Peppering the crowd was a not-so-surprisingly high proportion of web and computer graphics personalities. The Internet is hot, you know. Not just in the daily papers, but in the Ivy League corridors, the Guggenheim's gatherings, and even at congregations of estranged artists and philosophers in a Vegas casino. This conference hosted an alarming number of Internet "preachers," (and I call them preachers because that is precisely what they were doing). They: advocating a release of the physical body in favor of this move to the CyberCollectiveConsciousness. Me: yawning, between revelations.

This new collective consciousness, global neural network, homogenized world view, shared thought process, is regarded as a new phenomenon. Buy now and get your Cubic Zirconia pendant absolutely free, no money down. Act fast! Because CyberSpirituality will enlighten you, save your soul, make you a better person. Oh yeah... and it'll help you surround yourself with friends, love, and a world of people who care. Yes, it sounds like an infomercial. And guess who pays.

Why should transcendence suddenly be possible only now, and why does it suddenly require a computer? Haven't people practiced spirituality and meditation since year zero? Since humans had cognitive thought?

And how could we possibly advocate abandoning our bodies for computers? It seems absurd. It *is* absurd. I'm here to pronounce that the body is important. We need to eat. We need to sleep. We need to touch people and procreate. These acts are not only necessary for survival, but, for many, are quite enjoyable. And while these preachers may not be telling us to stand in the rain with our modems, fasting and chanting spiritual mantras; they are saying that the body is somehow separate from our spirit, and further, that it gets in the way of our spirituality.

> You are no more deep, spiritual, intelligent, beautiful, or real in cyberspace than you are in your apartment, at work, or in a nightclub.

And even if the body did keep us from our spiritual potential, how is the computer going to change that? Some preach that computers will remove the barriers of prejudice and stereotypes, emphasizing "equality," with statements like "in cyberspace, no one can tell if you're a dog." So if you *are* a dog, can you *pretend* to be a handsome football hero or a beautiful long-haired prom queen? And will people love you as much as you deserve? Maybe. Maybe not. That's not really the issue. This faux equality does not erase the absurdity of defining one person as "ugly" and another as "beautiful." It merely ignores such prejudices. We engage in denial to escape acknowledgment of the shortcomings of our society and ourselves. But because we don't have to change anything, it's a shortcut to personal development. Perhaps Win97 will have a shortcut to self-awareness, and perhaps one to God, too.

Computers can not switch our existence to autopilot.

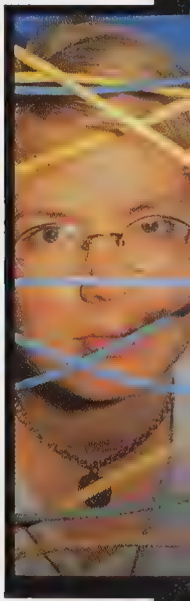
You are no more deep, spiritual, intelligent, beautiful, or real in cyberspace than you are in your apartment, at work, or in a nightclub. Whatever you hope to transcend to, must already be inside you; PC or no PC.

This ranting is not an effort to diminish the importance of cyberspace, community, *or* spirituality. The intent is let it be known: Spiritual enlightenment is *not* the reason to advocate the creation and evolution of cyberspace.

Cyberspace is about intellectual freedom and unlimited resources. It's about streamlining bureaucracy. It's about entertainment. It's about (as much as I hate to say this) efficient business. It's about telecommuting and clever art projects. It's also about community. But it should not be a community that lives *only* on the net. It must be a community that uses the net to expand ideas beyond the physical world, not stimulate or replace or deny physical existence.

Those who evangelize CyberSpirituality are merely exploring ideas of self and other, and some are more "preachy" than others. It's not the preachers I fear, but the masses that blindly follow their suppositions.

And, ironically, cyberspace is ultimately about dialogue. So please, keep talking to one another... in the real world. ▮



SHEL KIMEN (kimen@well.com) has spent more time online than is reasonably healthy for one person and dreams in hypertext.

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Product Information Number 371

HEAT KILLS AND SPEED THRILLS

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During the next 12 months, new CPUs will break all existing records for clock speed, performance, complexity, parallelism—even heat output. If you get a head-rush from megahertz, you'll love 1997.

Here's a sample of what's coming:

- A blistering CPU that sets a new clock-speed record of 533MHz.
- A 500MHz speed-demon delivering twice the raw performance of the 533MHz chip.
- The most complex superscalar processors ever built.
- Circuits that soar beyond 15 million transistors.

The good news is: All these chips should be available in 1997.

The bad news is: None of them run Windows, neither 3.1 nor 95. However, most run NT, and their new technology will eventually find its way into garden-variety PCs with x86-compatible chips.

All of these CPUs (and many more) were previewed at the Microprocessor Forum, an annual conference for chipheads in Silicon Valley. The MP Forum is unique in that it bans slick marketing pitches by PR people in favor of serious tech talks by real engineers. Even the most knowledgeable power user would be in deep water at this conference. It's the kind of event where folks gossip about branch target caches and translation lookaside buffers.

But it's also where semiconductor companies come to strut their best stuff.

By far the most freakish new CPU at this year's show was the 533MHz X704 from Exponential Technology. Exponential is a small start-up that was working secretly until now. The X704 is compatible with the IBM/Motorola PowerPC 604, so the only Windows it'll run is NT. But what makes the X704 special is its radical departure from industry-standard circuit technology. Instead of using CMOS, the basis for almost all modern microprocessors, the X704 uses a new combination of bipolar logic circuits and CMOS memory cells. The result is a CPU that has three things in common with lightning: It's wickedly fast, it burns lots of electricity, and it'll scorch anything it touches.

The bipolar twist requires a little explanation. Almost all CPUs these days are fabricated on a CMOS process. The Pentium and Pentium Pro are minor exceptions, because they're made on a process known as BiCMOS that's mostly CMOS with a few bipolar transistors. The bipolar elements are not significant and Intel is moving toward pure CMOS in 1997.

> The X704 has three things in common with lightning: It's wickedly fast, it burns lots of electricity, and it'll scorch anything it touches.

Exponential is doing just the opposite. All of the X704's logic circuitry (the part of a CPU that handles computation) is bipolar, and all of the memory cells (the onboard caches that temporarily store instructions and data) are CMOS.

Bipolar transistors are extremely fast because they don't swing between minimum and maximum voltages to change states, as CMOS transistors do. Instead, they swing between intermediate voltages only 0.5 volts apart. That superfast switching yields neck-snapping clock speeds. Exponential is offering three variations: 466, 500, and 533MHz. All of them will blow a 200MHz P-Pro into the weeds.

What's even more amazing is that the X704 is a simple CPU by modern standards. It only has 2.7 million transistors, and only 400,000 of those are logic transistors. That's about the same amount of logic as a 486. Clearly, there's plenty of growing room for this chip to get even faster.

But the downsides of bipolar circuits are power consumption and heat. The X704's peak power dissipation is a searing 85 watts. By comparison, the P-Pro 200 peaks at 35 watts, which is already considered pretty damn hot. To keep the silicon from percolating, the X704 needs the scariest heat sink you've ever seen, plus an extra fan. Exponential managed to get one of these blast furnace chips working in a Power Macintosh 8500 tower. I put my hand next to the output vents, and the rush of hot air reminded me of a blow dryer in a public restroom.

Still, the X704 is 1997's chip of choice, if you want to dazzle your friends—and if you don't mind using the PowerPC version of NT. The first X704 systems should be available in the second quarter for around $5,000.

TOM HALFHILL is a senior editor at *Byte* magazine and the author of two computing books. He first became interested in computers during the disco era.

Not to be outdone, Digital is introducing an even faster chip in late 1997: the Alpha 21264. Although its clock speed is a meager 500MHz, simulations indicate it will deliver twice the raw performance of the 533MHz X704, thanks to a more powerful core design. Estimated integer performance is almost four times as fast that of a P-Pro 200, and floating-point performance should be more than seven times faster. It has 15.2 million transistors and 128K of onboard cache. Again, you'll need NT for this screamer.

These RISC chips offer a peek at what's probably coming from Intel in the P7/Merced. The general trend is toward enormous onboard caches, tens of millions of transistors, and unprecedented complexity. IBM's new P2SC—a chip for Unix workstations—has 15 million transistors, six-way parallel pipelines, and enough functional units to handle eight instructions at once. AMD's K6, an x86-compatible chip coming in 1997, has 64K of cache, 8.8 million transistors, and six-way pipelines.

Until Merced appears—probably in 1998—Intel won't match these RISC chips' performance. Even the Klamath and Deschutes versions of the P-Pro aren't likely to exceed 300MHz any time in the next year. That's enough to keep Intel ahead of its x86 rivals, but the all-out speed freaks will already be running NT at 500MHz and beyond. b

PART II With its suite of all-powerful, all-unifying DirectX technologies, Microsoft promises to deliver game and multimedia performance that buries Apple and the console games once and for all. The man who came up with this grand scheme is Microsoft's Games Evangelist **ALEX ST. JOHN**, but you can call him...

Mister DirectX

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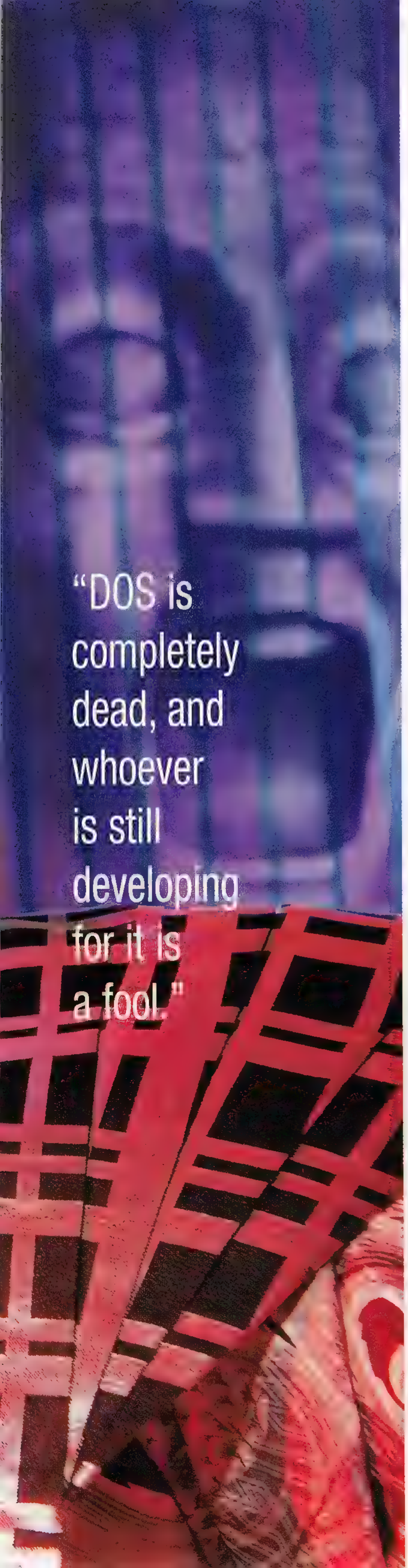

"DOS is completely dead, and whoever is still developing for it is a fool."

boot: Is DOS dead? If so, why do many developers still publish for DOS?

St. John: DOS is completely dead, and whoever is still developing for it is a fool. The answer would be: stupidity.

boot: But even Microsoft only just began publishing games for Win95...

St. John: And there are really good reasons for it. It takes two years to build a state-of-the-art title. And when you started that title development two years ago, you have contracting and publishing commitments. There are obligations to ship the title on time. Also, Windows 95 just recently hit the kind of saturation numbers necessary to get the sell through we need. A lot of those DOS games are just clearing the pipes through previous generations. This year you will see plenty of DOS titles, but next year, I don't see any new ones in the making.

boot: So you think 1997 will be it for DOS?

St. John: Pretty much. There will always be some stragglers.

boot: Does that include the U.K.?

St. John: The U.K. is a little slower. Our evangelism efforts over there haven't been skilled. It has been slower because we haven't been as helpful. Still, the U.K. is the best place to go shopping for good development talent. They have good programs, but can never ship a damn thing.

boot: Console game manufacturers are fond of claiming that the pool of games for their systems is better because they act as quality-control agents. Do you think that's true? And should a company—Microsoft, for instance—fill that role in the PC market?

St. John: Oh, absolutely not. The reason we're going to succeed is because we support open markets. We have no aspirations of monopolizing the market or being *the* publisher or something ridiculous like that. The reason our market grows and has been as healthy as it has is because it is an open market.

The idea that consoles are capable of running better games is also ridiculous. It's a very funny notion that was completely true until a year ago. This Christmas, we are running *Virtua Fighter* at four times the maximum frame rate of one of these machines. And four times the resolution of what the console's capable of. For something like a Sega Saturn or a PlayStation, a PC blows it away hands down, no question. I just got back from Tokyo, and the Japanese companies have an incredibly hard time grasping that.

The mindset of Japanese developers is just so skewed. I have the same conversation *all* the time. I had the conversation a year ago with Sega, before they had *Virtua Fighter,* and I said, "Where do you think the PC is in regard to 3D performance?" And they say, "Sony PlayStation... Saturn... and PC. Way down here."

That is ludicrous.

I say, "We outperform you hands down." They say, "Well, our engineers can't do it, therefore it is not possible." Send your engineers to me and I'll show them how. And they did, and now they have Sega Gameworks and 200 people for PC titles and nine Windows 95 titles this Christmas alone. And they did this because we showed them that the PC was a lot faster.

Now the question is: Is the PC faster than the Ultra 64? That's a weird, subjective question. We're certainly capable of much higher resolutions. The major thing they do is the antialiasing thing, which can be tricky in PC software. But can we render at higher resolutions and higher color depths faster? Yeah, about the same, if not better in certain areas. We have a lot more texture memory, so we can have a lot more detailed scenes. Our rendering in software may not be as fast, but you throw a 3Dfx and a Rendition card in there and it is, no question. You throw a 3D hardware accelerator on a PC and there's no console that even remotely touches it. And those days will never come back. The console will never be able to beat the PC. In fact, pretty soon, it is unlikely that even arcade games will.

boot: What's your opinion of Cyrix and other Intel competitors?

St. John: Imagine needing drivers for every CPU. It's kind of frightening because hardware is such a huge pain in the ass to deal with. Having the Intel standard has certainly made it easier to build operating systems. On the other hand, having a free market where there are lots of companies innovating better CPUs is also very cool. Clearly there are all sorts of horses that drive the market share. Clearly, the need for a standard has exceeded the need for a huge amount of competition. Otherwise these chips would be selling by the bazillions. Maybe one day—if they continue to exist—they'll have an innovation that will change everything. Which is nice. But it's not likely they'll ever surpass the quality of the Intel chip. And in the meantime, Intel's chips make regular innovation progress. You get good acceleration from them on a regular basis, so I don't see Intel significantly impeding the market and they do that chip making thing very well. The day they slow down, Cyrix is going to be there to take business from them and that's a good thing.

> **"... the U.K. is the best place to go shopping for good development talent. They have good programs, but can never ship a damn thing."**

boot: What kind of competition does Apple pose for the PC?

St. John: Apple's doing a good job of tripping over their own shoelaces. I would say they're probably going the route of the NeXT or the Commodore, and it's kind of a shame, because they were a very cool platform. It's pretty hard to imagine how they could dig themselves out at this point. Certainly we make a lot of money shipping our products on it, but it'll probably decline.

And the multimedia thing was theirs to lose. They had it. They were the multimedia leader. They made up multimedia, but apparently they must have been sitting still because we just went *whoosh!* right by with DirectX. They had no corollary to that. But it was a very quick change between them having state-of-the-art multimedia, and DirectX obviously being a superior multimedia technology.

boot: What exactly is Direct X? And what makes it so damn special?

St. John: Operating systems accumulate over time. DirectX throws code away. We go, "Well that was a dumb thing to write." One of our huge contributions to the operating system is throwing crap out. It's a very interesting philosophy, getting the necessary independence for people to innovate new game hardware, while keeping it fast. That's black magic.

There are a number of things that Direct-X does that seem like voodoo. "Let me get this straight, you add a layer of overhead and that makes everything faster?" But it works.

There is a lot of software innovation on top that lets the application know when it's getting software and when it's getting hardware. So DirectX provides a standard way to get device independence with just a tiny overhead and knowing when you have hardware compatibility.

Whenever we create a DirectX API, we ask, "Are we getting some magic out of this? Are we throwing something away effectively and are we creating something that actually improves the universe?"

DirectMemory is a classic example. We turn off the CD-ROM cache. This is one of those things that you just look at and think, "Obviously!" How often do you run multiple applications off your CD-ROM cache? Never. So what does a CD-ROM cache do exactly? It sits there and anticipates what you are going to load and stores it in RAM. Well, if you only ever run one application off the CD-ROM, doesn't it follow that the one application you're running probably knows better what information it is going to need next than the operating system? So let's just kill it, and turn that responsibility over to the game. The game gets an extra megabyte of RAM and speeds up the CD-ROM drive by 30 percent. It's just one of those things we do. Direct Memory says, "Hey I'm throwing out everything that isn't my game. I'm killing working memory management. I'm shoving everything out in the hard drive and that makes everything work faster."

boot: Who takes credit for DirectX?

St. John: Three of us really created it together. And Microsoft was the medium our bacteria colony grew in. There is a huge team of people responsible for making Direct X what it is today and they certainly all deserve credit for it. Now it kind of lives on its own.

boot: Who's currently using DirectX?

St. John: Activision has been a huge developer. *MechWarrior* has been a success story for the technology. They have a driver team working on seven different hardware drivers. Our 3D supports all of those.

id worked with us from very early on. There should be a DirectX version of *Quake* very soon.

LucasArts is doing a *Tie Fighter* game using DirectX. Other companies such as Sega are producing *Daytona Racer*, *Virtua Fighter*, and they just shipped *Bugs*; and a couple of other games this Christmas are going to be DirectX games.

We just shipped the second sampler, which has 20 games on it. And we got *Drowned God* from Inscape, which is a really gorgeous title. Not the kind of demanding game that we built DirectX for, but certainly a gorgeous game. I think we have like 300 DirectX titles coming out all together this year.

boot: What new game takes best advantage of DirectX?

St. John: The *Unreal* engine is staggering. They make use of our technologies. They're not using Direct3D yet, but we won't hold that against them. It's new to them. Let me

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Product Information Number 130

see... The *Organic Art* screen saver is a great use of Direct3D, a good example of something that's not a game. Games such as *MechWarrior* use all of DirectX really well. That was done last year and it's still selling very well. Which is very cool. What other games have we seen recently that are really blowing them away? *Virtua Fighter* really grinds out everything. Epic MegaGames' *Firefight* is just a 2D scrolling game, but it uses everything and is a really neat game. Scrolling three layers of bitmaps at 640x480 is very impressive.

boot: Why should software developers care about DirectX?

St. John: Game developers want to make content. Any time they are not making great games, they are radiating energy, being inefficient. Any time they're writing device drivers for three different kinds of hardware, their talents are being used ineffectively. They should care because Microsoft is trying very hard and, in many cases, has succeeded in making a thousand different platforms look like one platform. We are freeing development from the burden of dealing with all the stuff it shouldn't have to deal with. That's not always appreciated.

There are a few companies out there who have enormous resources devoted to writing drivers for every kind of sound card or every kind of video card—a whole team devoted to it. And so we come along with DirectX and say that problem is gone. Whole groups are without jobs because that was all they did. And they say, "Oh, we don't like your driver. It doesn't do what we need." A lot of companies are struggling with that transition.

> "You throw a **3D** hardware **accelerator** on a PC and there's no console that even **remotely** touches it. And those days will **never** come back. The **console** will never be able to beat the **PC**. In fact, pretty soon, it is unlikely that even **arcade games** will."

St. John imagines a future where he can walk into the Internet and shout, "I want a Hummer!" and start haggling about the price.

The other reason they should care (and this is a major one), is that while the console market has been doing *this* and the game market has been doing *that*. The PC game industry has just been *growing*. A large part of this is because of DirectX and the success of Windows in the home. The PC is going to be a predominant platform because it has such competitive innovation. It's going to spill into other entertainment spaces as well. Pretty soon you'll be able to make a DirectX game that not only ships into the home on the PC but also ships into the arcade, because the PC is also the best arcade machine. And we might even see DirectX as the best way to get to the console platform as well.

In the future, someone who knows how to build good DirectX games will be able to get their titles to a lot of platforms for a fraction of the effort that it used to take to migrate from arcade to console to PC. That will make the whole market richer for everybody.

boot: Has Microsoft ever offered game developers financial incentives to use DirectX drivers over DOS, or anything else?

St. John: Well, no. Part of evangelism is to make sure the right technology is built. Show people how to use it and then help people have market success when they've done that.

I've certainly had partnerships with companies where we've offered to help them port game titles to DirectX early on. I've paid for the contractors and things to do that. And we've had marketing programs where we've promoted titles and so forth. But there's been no point when I've handed a check to somebody and said, "Do DirectX development." No.

But that's to a degree, you know.

If you have small game companies... they have to make a living. They're not like us big companies who can throw money around gambling on wild-ass things. When DirectX was new, you know, we could have a company say, "Yes. We'd love to do DirectX development, but we can't gamble on you because our next title is our next year's existence. You'd put us out of business if we're wrong." And so our subsidizing the effort to port some new titles early on certainly made it easier for some of these folks to take the risk. And now they're off on their own, doing their own thing; that's because it's been *that* successful. *MechWarrior* and the first ports of *Doom*, we did that, you know, and look at them—they're all at the top of the charts now. I don't think these companies are regretting that effort.

boot: Microsoft delayed Direct3D so many times that both software developers and hardware manufactures had fits. Some manufacturers had to ship product before Direct3D was available. Why did it take so long for this technology to come to market?

St. John: First of all, I'd like to make apologies for all the delays that we had to go through to ship the technology. Today, Direct3D is shipping. It's very integrated. It'll have regular releases. But it was a very bumpy ride getting the technology adopted. Not just because buying a company and making technology transitions are difficult, but because, at the time, Microsoft had two or three internal development teams working on 3D APIs.

There was this OpenGL movement, "We don't need another API!" And so there were a lot of internal machinations that slowed down Direct3D. We felt very bad about that and did our best to smooth it out and not have it happen again in the future. The funny thing is that after the huge rush to get Direct3D out, we landed ahead of the market... miraculously. We got this technology out early. And when you think about what Direct3D is, it's a driver architecture for rendering lighting and transformations; technology we're not going to see in hardware for three years, even four; and the first real 3D hardware accelerators hadn't even shipped. And the thing is we've gone through two releases of Direct3D. And the purpose for building the damned thing is for hardware. That's the only thing that makes sense.

Our 3D raster is very fast, but we're never going to beat a *Quake*. Actually we are. But we're never going to beat everybody's hand-coded engine and it's not our purpose to do that. You want the best and the fastest, but you want it general purpose. Somebody who's tweaked the thing for a particular application is always going to be faster.

From now on it's going to be pretty smooth sailing. That Microsoft has an API so much earlier than the actual pull of the hardware means we may have one of the smoothest transitions to a radical new technology that the PC platform has ever had. And I expect it's a very positive thing.

boot: What about support for Windows NT?

St. John: The current version of NT is shipping with DirectX 1.0 in it now. Things like the sound drivers are just soft emulations and the joystick is just digital, but we don't think that's a major problem. The next version of NT is going to have everything, all the way. It's very important because DirectX promotes multimedia, which NT is for. Also NT is ideal for going into the arcade. We expect that as people want to use their PC for an arcade machine, they'll want to use NT. Plus, because NT has all the multimedia capabilities that Windows 95 has—plus the other things that NT has—it would be a very powerful medium for making industrial-strength games. And so we're jamming everything in there as fast as possible.

"Honestly, a consumer shouldn't give a damn about DirectX. A consumer should give a damn about having a great game that works."

boot: Will Microsoft release DirectX performance benchmarks so users can accurately gauge the performance of different systems and subsystems?

St. John: The answer is yes. But I'm not sure we are going to build this suite, but we know that one is needed very badly. It's a tough problem and we're working fairly closely with a number of standards and benchmarking bodies to try and get things defined. And it will probably get bumpy and ad hoc early on 'cause it's a nasty problem. Again, whether we're going to build our own team or whether we're going to work with an outside body is not completely clear yet.

boot: So, are the hardware manufacturers finally ramping up now?

St. John: Oh, yeah. The Rendition and 3Dfx are awesome. Those were the first 3D cards that were actually not 3D *decelerators*. The ones on the drawing boards after that are even better. Of course, there's a number of crap chips out there too.

boot: Why should gamers care about DirectX games?

St. John: Honestly, a consumer shouldn't give a damn about DirectX. A consumer should give a damn about having a great game that works. To the degree to which Direct X makes better games, with easier access to them, that is true. DirectX dramatically improves the quality of games on the PC by allowing game developers to focus on their content rather than dealing with all the intricacies of how the PC actually works.

And it also means much broader access to that content. And games, if they don't have a PC, will be in the arcade. So consumers will have access to better content faster because of this technology.

boot: How precisely will Direct3D 3.0 support systems armed with MMX and a Direct3D video card?

St. John: What we have is a hardware emulation layer: a soft emulation for everything you do with hardware. And so, if you're calling Direct3D, the API will look the same whether you're getting soft emulation or hardware acceleration. The API lets the game work the same, run the same way, look the same. If hardware acceleration is present, it takes management of the hardware acceleration. If there is no hardware acceleration present, then you get soft emulation. It just happens automatically. The game might not even be aware of it.

As MMX enters the market, I think you'll get games making smarter use of it. Profiling the hardware and saying "If it's MMX and it's *this* kind of hardware, then I can balance who does what a little more efficiently to get maximum yield out of both." If you're coding a game to DirectX, even stupidly, you're going to get a huge benefit out of MMX. Just calling Direct3D, or DirectSound, or DirectVideo is going to

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Product Information Number 237

use MMX magically and everything's going to run better.

The MMX version of Direct3D's RGB modes run better than the linear ramp mode, so RGB mode can have all 24-bit color light sources. Ramp mode was just white light, which is what most games use. I haven't seen a single game that uses color lights today. The ramp mode version of Direct3D used to be the fastest, but the MMX version of Direct3D's RGB drivers outperform it 120 percent faster with everything else turned on. So the game is actually faster if you use all the vector light sources. "Turn them on! What the Hell! The game runs faster!" The whole system just goes faster. It's a good deal.

boot: Microsoft recently announced DirectX would *not* support force feedback and VR gear, despite company representatives stating it would be in DirectX 3.0 at the 1996 Computer Game Developer's Conference. Why the delay? And is it all related to Microsoft's own efforts to develop force-feedback game peripherals?

St. John: We define the API, but we're not psychic. If we knew what the best new ideas would be, we'd have them ourselves.

Force feedback is an unknown. Nobody knows how games are going to use it, how users are going to react to it or what they're going to want from it. Nobody knows this. So, for us to go and redefine APIs to support force feedback, for example, before anybody knows what's going to be cool about it, is silly. We're just going to create a bunch of curves nobody's going to want. That doesn't help anybody.

The first thing we can do is say, "Well, we know there are things in other devices that we guarantee people will want," and that may include the ability to communicate information back to the joystick. So here are the pointers to a 32-bit data structure of an undefined nature and you can pass it back to the joystick. We are not going to define the standard way of describing what's getting passed back, but you can still go get a force-feedback joystick and an API to support it, but *we* don't know how to yet.

The same is true for VR devices. DirectX doesn't impede you from shipping new VR technology, it actually adds value to it. Our relationship with Microsoft's hardware group and developer group is exactly like it is with every hardware and software company in the industry. There's no favoritism. There's no collusion going on. In fact, it's quite the opposite. We're dying to make something like DirectVR. The major obstacle is other higher priority demands from developers.

As cool as we may think VR is, the first development resources go into people's demands now. Like DirectMemory. We just made all applications go 30 percent faster. Would you like us to do that or support head-mounted displays? "Make everything go faster, please." Unfortunately, it tends to be that way. As fast as we can hire more people, we're hoping to get enough critical mass to be able to do some of the things that we like to do that aren't as critical.

boot: Well then, when can we expect to see Microsoft's force-feedback technology?

St. John: That depends on what needs to be built.

boot: Microsoft manufactures mice, joysticks, and game packs. Will Microsoft ever take the plunge and introduce its own personal computer line?

St. John: We have no reason whatsoever to dream of messing with our OEM distributors. So I don't think that's likely to ever be the case. The fact that we make parts that just plug in, that's kind of a nice business to be in, but clearly that's not our primary business. It's quite a leap to imagine us going from the only devices we actually ever had success with, wrapping balls and buttons and plastics, to hardware and computers. When it comes to wrapping little balls and buttons with plastic, we excel at that. Try to introduce a sound card? That's too much.

boot: Have you ever been invited to Bill Gates' house?

St. John: Bill and I see as much of each other as we need to. Bill's pretty private and I can absolutely understand that, having seen some of the interactions he has had with people. So, I don't think a lot of people go to Bill's house, which is probably a good thing. I met one of Bill's garage programmers at the gym one morning. He has 11 people programming the humidity, temperature control, automatic door openers and what have you. Bill collects classic cars, so he has like 150 classic cars. No, I haven't been invited to Bill's house. No, I'm not offended that Bill hasn't invited me to his house. I'm glad. I'm too busy to be making social calls.

boot: Microsoft is the big fish and many people want to see the company fail because of that success. How does that affect you?

St. John: Personally, I can't imagine a better place to go and have great ideas that change everything. There's no way the game industry could ever have been fixed without a Microsoft. No body, committee, industry group, whatever could have gotten together and said, "Let's go make something that fixes these problems!" and unify on it. It doesn't happen. We did this because we love making game technology. We never could have done things like this if companies such as Microsoft weren't so successful; and so to the extent that Microsoft is an industry leader and makes tons of money and creates some envy, it's understandable. I have trouble saying that's a good or a bad thing. I'm just very glad Microsoft exists and that we can do this. Personally? I think there are a lot of game companies out there that are going to make a ton more money because of us.

"... Microsoft is trying very hard and, in many cases, has succeeded in making a thousand different platforms look like one platform."

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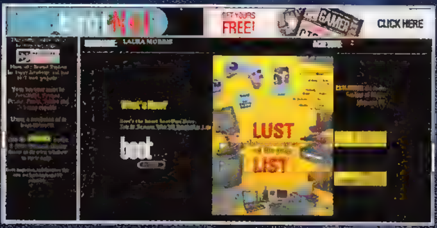
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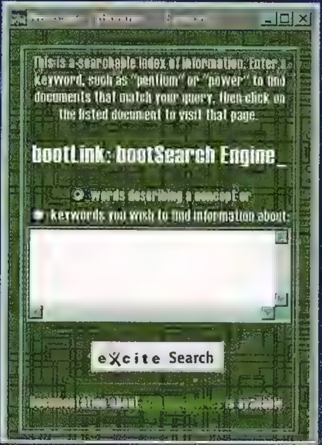

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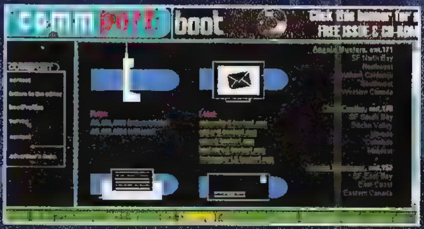
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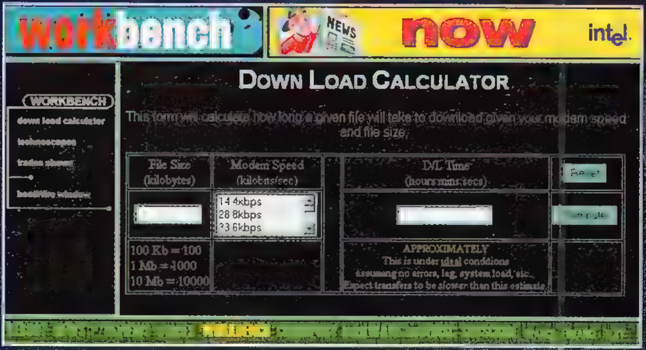
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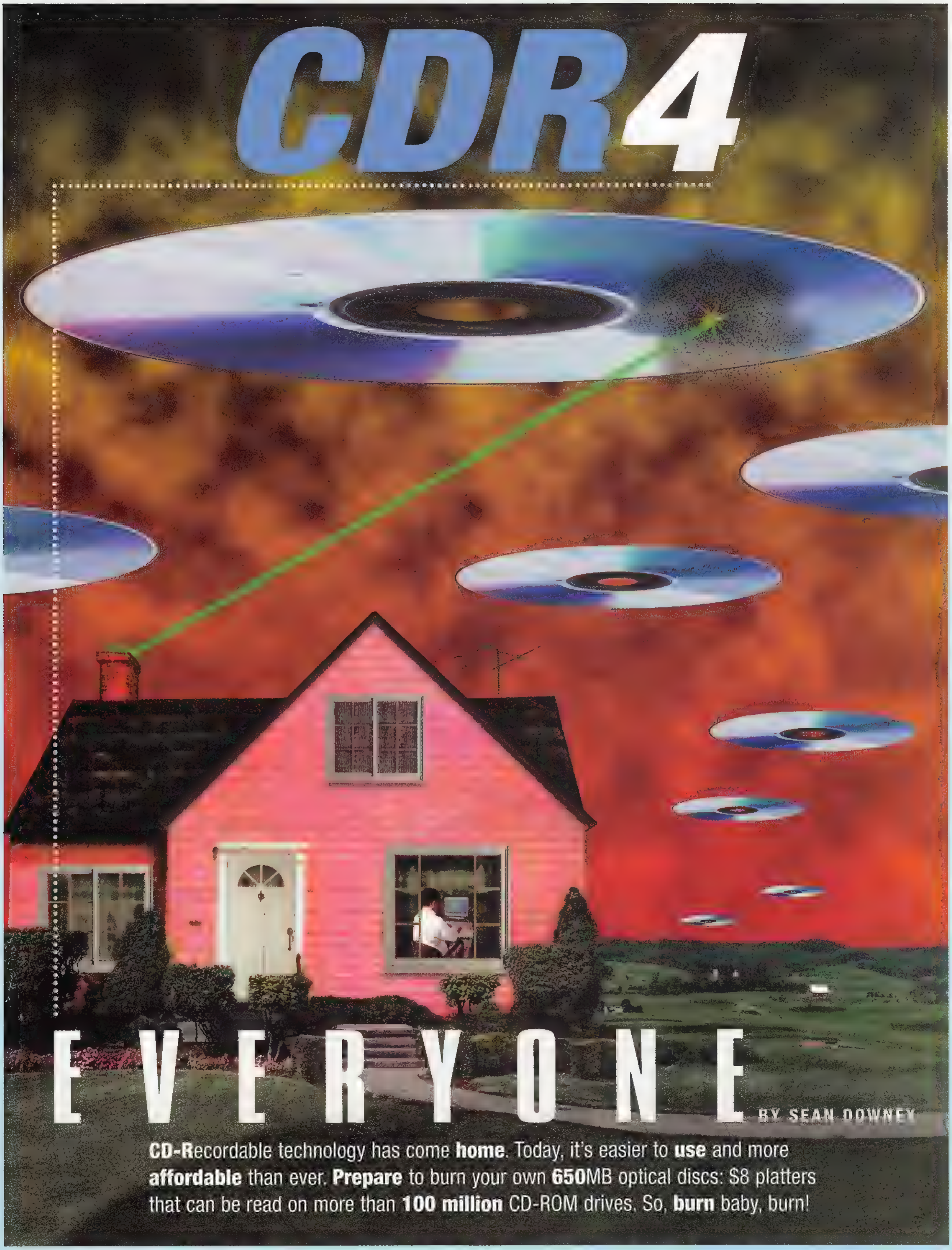


CDR4 EVERYONE

BY SEAN DOWNEY

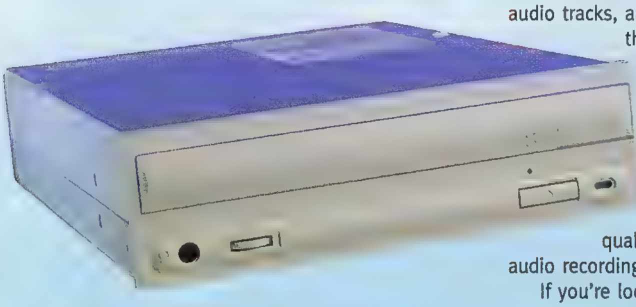
CD-Recordable technology has come **home**. Today, it's easier to **use** and more **affordable** than ever. **Prepare** to burn your own **650**MB optical discs: $8 platters that can be read on more than **100 million** CD-ROM drives. So, **burn** baby, burn!

ILLUSTRATION: LOU BEACH

"**Burn** a disc and just about **anyone** will be able to **read** it. Send your **data** on

TEAC R50S

It's built for speed but not for speed bumps



With the introduction of the R50S, Teac hopes to join the ranks of the CD-R elite—the handful of drive manufacturers making 4x drives. Based on Teac's own drive mechanism, the R50S features a 1MB buffer, supports packet writing, and is equipped to write most major CD formats, including CD-ROM, CD-ROM XA, CD-i, and CD-DA.

Using Adaptec's *CD Creator 2.0*, which comes bundled with the drive, the R50S created a 390MB ISO image file in 12 minutes and burned it in 13 minutes. It handled the conversion of WAV files to audio tracks, and the creation of an enhanced CD like a Wheaties' poster child. The drive scorched through our on-the-fly torture test in an astonishing 9 minutes. I think I'm in love.

The R50S duplicates audio and mixed-mode discs too. But during playback we noticed skipping on multiple tracks. We ran the audio CD duplication test again and found the same errors on different tracks, indicating a few glitches in the drive's digital audio extraction capabilities. I guess it's better to have loved and lost...

Burning at 4x is more reliable than burning at 2x, because the high speed gives the recorder's laser less time to improperly burn pits on the disc. The R50S damages this reputation for superior quality with its consistently unreliable audio recording.

If you're looking for sheer speed, this drive's got it to spare, but if you're looking for reliability, look elsewhere.

boot verdict 7

PRICE: $950
COMPANY: Teac
PHONE: 213.726.0303
URL: www.teac.com

Since the first digital audio CDs were introduced in 1983, ambitious types (you know, the typical *boot* reader) have dreamed of creating their own platters. Crisp digital audio, combined with the nigh-invincible disc, made CDs the distribution media of choice for record companies. CD-ROM's arrival in 1985 put massive amounts of information at our fingertips.

Despite drives that could be outrun by three-toed sloths, CD-ROM's huge storage capacity brought multimedia into the home. Transfer rates and access times have improved steadily and today, you can't buy a new PC that isn't equipped with a CD-ROM drive. In fact, a recent poll revealed that far more U.S. households have CD-ROM drives than have online access.

As the cost of CD-ROM drives dropped through the floor and became ubiquitous accessories in new PCs, software publishers turned to the new media in droves. Why spend time and money distributing titles on multiple floppies when you can fit everything on a single disc? CD-Recordable drives finally made their appearance in 1991, but only the most ambitious PC owner could meet the $10,000 price tag—leaving most consumers and independent publishers in the cold. Today, you can buy a good CD-R drive for less than $500.

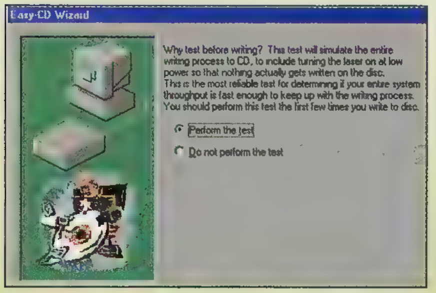
Meaty Media

CD-R media hasn't changed much over time. Instead of the pits and grooves stamped into the metal of mass-produced CD-ROM discs, CD-R media consists of layers of organic dye, gold or silver alloy, and polycarbonate plastic. This is the same material that makes high-quality windshields shatterproof, giving CD-R discs a life span of more than 100 years, and making them durable enough to repel the small rocks kicked up by the tires of large trucks driving at freeway speeds.

Think of these discs as universally accessible, write-protected floppies—with 450 times the capacity. Thanks to the ISO 9660 CD-ROM file-format standard, virtually any computer can read a CD-ROM disc—even if the data can't be *used* on any computer: You can play QuickTime movies on different machines, for example, but you can't play *Duke Nukem 3D*. ISO 9660 was designed as a least-common-denominator file system: 8-dot-3 naming conventions (with characters limited to uppercase letters A to Z, numerals 0 to 9, and the underscore character), and subdirectories limited to eight levels deep. The promoters of various

EASY-CD Pro 95

Handy prompts and an extremely stable engine make for painless CD creation



Why test before writing? This test will simulate the entire writing process to CD, to include turning the laser on at low power so that nothing actually gets written on the disc. This is the most reliable test for determining if your entire system throughput is fast enough to keep up with the writing process. You should perform this test the first few times you write to disc.

● Perform the test
○ Do not perform the test

Easy-CD Pro's original Win95 translation had all the power and stability of Adaptec's underlying XCD engine, but the interface was downright anemic. Apparently Adaptec missed the boat that Corel caught with *CD Creator 2.0*'s Disc Wizard, which provides quick and painless burns.

Well, Adaptec must have been feeding *Easy-CD Pro* gristle, because the new version is fat. New features abound, such as the CD Deck, which allows easy editing of audio tracks; a CD sleeve creation utility; an extremely intuitive Wizard; as well as added support for enhanced mode discs. The software also has excellent reporting on both recorder capabilities and session status. *Easy-CD Pro* runs on Windows NT 4.0 and 3.51, supports the most drives of any CD-R mastering software, and comes bundled with many of the drives shipping today.

The ASPI (Advanced SCSI Programming Interface) layer of *Easy-CD Pro* provides a more advanced hardware interface to enhance the software's stability, through features such as auto-insert blocking. This prevents continuous polling of the drives from interfering in the burn.

Despite all these advanced features, *Easy-CD Pro*'s on-the-fly recording abilities choked during our torture test of 20,000 compressed icons. The software wouldn't switch to track-at-once recording like *CD Creator 2.0* and *Gear 4.0*, insisting instead on creating an image on the hard drive before burning it to disc. While this isn't a severe limitation—*Easy-CD Pro* still reliably burned the data—it did deny the software the *boot* Kick-Ass award.

boot verdict 8

PRICE: $349
COMPANY: Adaptec
PHONE: 800.774.6228
URL: www.adaptec.com

anything else and you take your **chances**."

BLASTER CD-R 4210

This is one Blaster product that is substandard when it comes to sound

4X READ
2X WRITE
CREATIVE
BUSY WRITING

The Blaster CD-R 4210 is an internal multisession-capable 2xWrite/4xRead drive with a 1MB buffer. Capable of producing CD-ROM, CD-ROM XA, CD-Plus, and CD-i discs, as well as digital audio CDs; the Blaster CD-R comes bundled with *Easy-CD Pro 95* and an Adaptec ISA SCSI adapter. The accompanying manual is friendly to the novice CD-R user, and mildly pedantic to the experienced one.

Easy-CD Pro balked at our on-the-fly recording torture test. When we forced the burn, a buffer underrun resulted. (See the review of *Easy-CD Pro* for more details.) Still, the drive performed adequately on other tests.

While on-the-fly recording problems can be attributed to software, the digital audio extraction errors we experienced in our disc-at-once tests indicate a problem with the CD-R drive itself. We successfully duplicated an audio CD and a mixed-mode disc only to find the audio tracks unrecognizably garbled on playback.

The Blaster CD-R handled the conversion of WAV files to audio tracks without a problem allowing the track-at-once creation of both an audio CD and an enhanced CD. It also turned in respectable times creating (12 minutes) and burning (13 minutes) a 390MB ISO image file.

The Blaster CD-R is a competent solution for modest CD-R needs. However, its mediocre on-the-fly recording performance means that you'll definitely need to factor in lots of extra hard drive space for creating an image file when using this drive.

boot verdict

PRICE: $699
COMPANY: Creative Labs
PHONE: 800.998.5227
URL: www.creativelabs.com

operating systems have added various extensions to ISO 9660, including Win95's Joliet, Unix's Rock Ridge Extensions, and Mac System 7's HFS. These extensions have delivered additional functionality (support for long file names, for example) at the expense of cross-platform compatibility.

Internationally standardized data access is the crux of CD-R's advantage over other removable storage media. PD, Jaz, Zip, SyQuest, and other proprietary cartridge technologies require recording and playback on the same type of device. MO drives comply with a different ISO standard, but these devices still aren't nearly as common as a CD-ROM drive. Burn a disc and just about anyone will be able to read it. Send your data on anything else and you take your chances.

CD-R also boasts a formidable cost-per-megabyte advantage. Jaz disks cost about 10 cents per megabyte; CD-R discs cost about one cent per megabyte. CD-R is even beginning to erode one of the final advantages that cartridge drives have always offered: Ease of use. Stores advertise "complete CD-R solutions," but that's not truly possible until CD-Rs are bundled with new PCs, so that everything works right out of the box. PC manufacturers will soon be doing just that.

Check Your IDE at the Door

Be aware that CD recording carries some stringent system requirements, especially in terms of data throughput. Data must flow to the CD-R in a steady, uninterrupted flow, which explains why CD-R drives have always used SCSI interfaces. (A new generation of IDE-ATAPI CD-R drives is coming, but we're withholding judgment until we've had a chance to torture—err, test—them.)

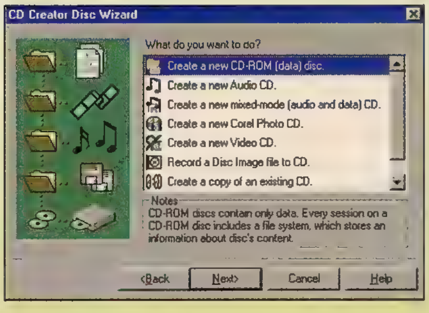
Good Housekeeping

Keep it clean and enjoy better burns

- Don't use your computer for anything else while burning a disc.
- Put your source drive on a different data bus than your CD-R drive to ensure a steady flow of data. Use an EIDE hard drive and a SCSI CD-R drive, for example, or install two SCSI host adapters—one for the hard drive and one for the CD-R.
- Dedicate 700MB of your hard drive for image files—as well as on-the-fly recording.
- Make sure that your hard drive has an average access time of less than 12ms, and that its sustained data-transfer rate is at least 900K/sec.

CREATOR 2.0

Creator's Disc Wizard takes your hand and guides you through the dark shadows of CD mastering



What do you want to do?

Create a new CD-ROM (data) disc.
Create a new Audio CD.
Create a new mixed-mode (audio and data) CD.
Create a new Corel Photo CD.
Create a new Video CD.
Record a Disc Image file to CD.
Create a copy of an existing CD.

Notes
CD-ROM discs contain only data. Every session on a CD-ROM disc includes a file system, which stores an information about disc's content.

Creator 2.0 has long been a personal favorite of mine. It's easy to use, has tons of solid features, comes with useful utilities, and its Disc Wizard provides a quick and painless way to create CDs the first time around. Shame it's a dead product. Adaptec bought the software from Corel last year and will not be upgrading it. Instead, they will be releasing a new product that merges the features of *Creator 2.0* with *Easy-CD Pro* in April of this year.

Creator 2.0 comes with photo and video CD creation utilities; a sound editor and music database cataloger; MPEG encoder and player by XING Technologies; CD duplicator, which does quick and dirty disc dupes from CD-ROM to CD-R; and Session Selector, which allows you to activate different sessions on a multisession disc. Corel must have run out of clip art when originally developing *Creator 2.0*, so they just threw in a mishmash of utilities.

Creator 2.0's reputation for being incredibly slow is duly earned. All of the drives we tested with the software regularly took longer to complete nearly all the basic CD-mastering tasks than the same drives using *Gear 4.0* or *Easy-CD Pro* software. This slowdown could be the result of the software bypassing the ASPI layer with its own suspiciously buggy drivers. These have a tendency to overwrite the drivers of other CD-R mastering programs and interfere with their operation. This snafu brought our test system to its knees on more than one occasion. Needless to say, it's no longer my favorite software.

boot verdict

PRICE: $249
COMPANY: Adaptec
PHONE: 800.774.6228
URL: www.adaptec.com

> "The **new** CD format **eliminates** these **limitations** and

OLYMPUS CD-R 2x4

It ain't heavy… it's my CD-R drive

OLYMPUS
CD RECORDER
2x4

This drive is solid. We snickered at the massive size of this unit when we first lugged it out of the box, but our guffaws soon turned to grins. The CD-R 2x4 successfully plodded through all of our tests as solidly as a redwood two-by-four.

The CD-R 2x4 is an external drive based on Olympus' own 2xWrite/4xRead mechanism, with a 1MB buffer to control data flow. It supports packet writing and all the CD-R formats, including: CD-ROM, CD-ROM XA, CD-Plus, CD-i, and CD-DA. It comes with all the necessary equipment you'll need to start burning: *CD Creator 2.0* software, SCSI terminator, and cable—everything that is, except for a SCSI adapter. This may discourage buyers who are looking for a complete solution.

The CD-R 2x4 completed our on-the-fly recording torture test in a respectable 10 minutes. It took 18 minutes to create an ISO image file (an abnormally long time) and burned it in 25 minutes. The drive proved up to the digital audio extraction tests, where most other drives stumbled. We successfully duplicated a mixed-mode disc and an audio CD with no errors during recording or, more importantly, during playback. It converted WAV files to audio tracks and handled the creation of an enhanced CD in the steady, yet competent manner that is its trademark.

While its big box may not be pretty to look at, the CD-R 2x4 delivers some pretty impressive results. If you're not in a huge rush to get that burn done, this drive will do one with very little fuss, and do it quite well thank you.

boot verdict 7

PRICE: $649
COMPANY: Olympus Image Systems
PHONE: 800.347.4027
URL: www.olympus.com

All CD-R drives are equipped with their own buffers—usually 1MB of memory—in order to guarantee a steady data flow. Some drives, particularly the new generation of drives that can write at 4x speed, are equipped with 2MB buffers to guard against underruns. Buffer underrun—a condition in which the CD-R empties its buffer before the burn is complete—is the bane of the mastering process.

Drag and Burn

CD-mastering software has a reputation for being complicated and obtuse. Some packages are definitely better than others (see the reviews in this article for this author's take), but the process isn't all that difficult if you take your time and approach the task well prepared. A new disc can take on a number of different flavors (Red Book, Green Book, Blue Book, Yellow Book, and so on), so it pays to know what you're doing before you click the Burn button. With the best of the new software, you can lay out a CD with drag-and-drop ease, and use wizards that mask intricate mastering processes with simplified step-by-step guides.

Veteran CD-R users have long dreamed of writing directly to CD-R *without* mastering software. In these dreams, the CD-R drive appears as a single drive letter designated by the operating system, allowing drag-and-drop writes to disc from Win95's File Manager and Explorer, and use of Send To and Save As commands from any application. Packet-writing technology achieves this ideal by allowing users to record small amounts of data to disc using less overhead than previous methods. With packet writing, a hard-drive cache is created and data is burned to disc either when the cache reaches a certain size or on demand. With the old ISO-9660 standard, even the most trivial update to a file's attributes forced a rewrite of the disc's entire path table and volume descriptor. The new CD format eliminates these limitations and adds a standardized packet-writing format to CD-R mastering.

Universal Disc Format

Adaptec's *DirectCD* and Software Architects' *Write UDF!* will be the first software solutions to implement the new standard. They both allow packet writing in the new UDF format, with the option of finalizing the disc in ISO-9660 so that older CD-ROM drives will be able to read the disc. Other software packages, such as JVC's *CD-R Extensions*, Sony's *CD-RFS*, and Cheyenne's *Zap for CD*

GEAR 4.0

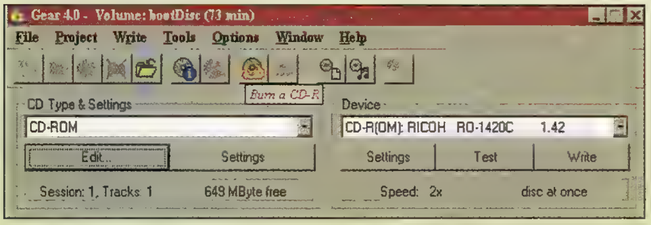
A well-lubricated machine

boot DISC
Try it out!
demo on the **bootDisc**

boot KICK ASS! PRODUCT

After using and testing innumerable CD-R drives, we've come to realize that they share a lot of similarities as far as speed and features go. That's not to say that there aren't drives of superior quality and drives that just flat out suck, but with so many OEM companies repackaging the same drive mechanisms, it all comes down to what else ships in the box. When you're digging through the packaging, the SCSI adapters, cables, terminators, blank media, motivational video clips, and whatever else that makes a "complete CD-R solution," keep an eye out for what really matters—the software. Bad CD mastering software can make a drive suck down data slower than a termite digesting a Formica table.

We found that when it comes to CD burning software, *Gear 4.0* is the best. It outperformed the other products in this group, earning it *boot*'s Kick-Ass award.



Gear 4.0 - Volume: bootDisc (73 min)

CD Type & Settings: CD-ROM

Device: CD-R(OM): RICOH RO-1420C 1.42

Session: 1, Tracks: 1
649 MByte free
Speed: 2x
disc at once

Gear 4.0 hits your desktop like a toolbar on steroids. It doesn't look like much at first, but this software is *it*. Advanced features include: importing external images created with other CD-R software; editing audio track cue sheets; and creating batch files to automate repetitive operations. From the pull-down menu on the left (CD Type and Settings) you choose what type of CD you want to create: CD-ROM, CD-ROM XA, Mixed Mode 1 (CD-ROM plus audio), or Mixed Mode 2 (CD-ROM XA plus audio). Then you create a virtual image where the data will be loaded. The virtual image contains the minimal amount of adds a **standardized** packet-writing format to **CD-R mastering**."

SONY SPRESSA 940

Write your CD-Rs again and again and...

The Spressa 940 arrives hand-in-hand with *CD-RFS*, Sony's new packet-writing software. *CD-RFS* is Sony's proprietary implementation of the now-standardized CD-UDF file system, allowing CDs in progress to be used like any other random access media, such as a floppy or a hard drive. The disc must be "frozen" in order to play on other CD-ROM drives that support packet-written discs. When the disc is inserted, the first thing that appears is the *CD-RFS* read-only driver. Installing this driver gives access to the disc's contents. *CD-RFS* will work with any CD-R drive that, like the Spressa 940, supports packet writing, which basically means any drive manufactured during the past year. (For more about packet writing, see the article below.)

The Spressa is an internal drive, using Sony's own 2xWrite/4xRead mechanism, with a 1MB buffer. The multisesssion capable drive can produce CD-ROM, CD-ROM XA, CD-i, and Red Book digital audio discs. It comes bundled with *Creator 2.0* and an Adaptec ISA SCSI adapter.

Using *Creator 2.0,* the Spressa put in an impressive time of 10 minutes on our on-the-fly recording torture test. We successfully duplicated a mixed-mode disc and an audio CD with no errors during recording or playback, and converted WAV files to digital audio tracks while creating an enhanced CD.

The Spressa 940 is a great drive for those needing archiving, backup, and data storage solutions. It's not a very dazzling drive, but then again, neither are all those tasks it's so handy for.

SONY
Spressa
2x 4x

boot verdict

PRICE: $799
COMPANY: Sony
PHONE: 800.352.7669
URL: www.sel.sony.com

8

(formerly Moniker's *Spira*) have implemented these features through their own propriety formats, but they'll soon offer upgrades that support the new standard. When Windows 97 ships this summer, it will have CD-UDF reading capabilities built into its file system, delivering OS-level support for new CD technologies, including CD-RW and DVD, which will have their tracks notched in the new format.

Kill the Worm

The biggest drawback to CD-R has always been the irrevocable nature of the writing process. Multisession technology wounded WORM (WriteOnce Read Many), by enabling you to write to a CD-R during several different passes, but you still have to close out the disc before it can be read in a conventional CD-ROM drive. Make a mistake or get a hold of a piece of bad media, and your investment of $8 and two hours of mastering time will produce nothing more than a shiny, golden coaster; an everlasting testament to your failure. There is no process that makes a previously burned CD-R disc reusable.

But never fear, new technology is here! The coming generation of CD-Rewritable (CD-RW) drives will read, write, and *rewrite* CDs. Unfortunately, CD-RW won't be 100 percent backward compatible. CD-RW drives will read CD-ROMs, but existing CD-ROM drives won't read CD-RW discs. CD-R drives won't be able to read—or write—CD-RW discs, either.

CD-RW discs accomplish the trick of rewritability by using a different layering scheme than CD-R. A CD-R drive writes data on the surface of the media by burning the disc's dye layer with a laser. Instead of an irreversible burning process, CD-RW drives use phase change technology. In this case, the laser changes the state of the media's recording layer from a reflective state to a light absorbing state. Because this change in reflectivity can be reversed, the disc becomes erasable and reusable. (Panasonic's line of PD drives have used phase change technology for nearly two years, but that media is encased in a hard-shell cartridge and is incompatible with CD-ROM technology. PD drives can read CD-ROM discs, but CD-ROM drives can't read PD media.)

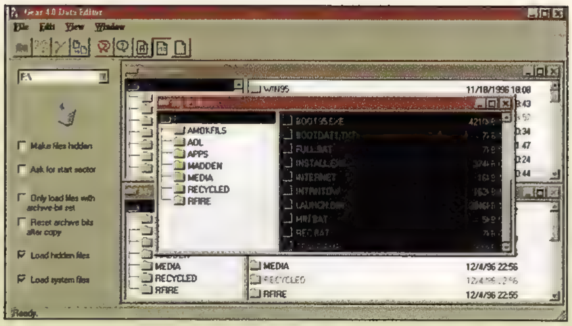
CD-RW's logical file format is derived from CD-UDF, so CD-RW drives will be capable of packet writing by design. CD-RW is like a big, fat hard drive squeezed into a thin, shiny wafer. Considering its capacity (650MB), speed (equivalent to a 4x CD-ROM drive), and random-access nature, CD-RW

information needed to create a CD, stuff like file size, location, properties, and date. Drag and drop from drive windows to track listings to edit your CD layout in the Data Editor. Each file added updates the virtual image. The non-ISO filenames toolbar provides a place where you can set how you'd like non-ISO filenames handled, with prompting or automatic translation options.

Listed on the right-hand (Device) side are attached CD-R drives. The Settings button allows you to tweak recording methods, disc fixation, and buffering settings. *Gear 4.0* supports disc-at-once, track-at-once, and fixed packet-writing recording methods. A large part of *Gear 4.0*'s performance increases in the new version is due to a new cyclical buffering scheme; where data, after being formatted for the CD-R, is passed to a buffer on the hard drive that's the same size as the buffer on the CD-R. As the CD-R drive's buffer empties, the data waiting on the hard drive is passed to the drive mechanism for writing.

In addition to giving comprehensive instructions about how to use the software, the *Gear* manual also contains an extremely useful list of CD-R drives it works with, giving a rundown of recording speeds, digital audio extraction abilities, buffer sizes, and the current firmware version.

A new version of Elektroson's *Gear* has already been announced, which will write CD-UDF and ISO 9660 discs. *top.Gear* is scheduled to ship in March and will use the same Kick-Ass engine that drives *Gear 4.0.*



☐ Make files hidden
☐ Ask for start sector
☐ Only load files with archive-bit set
☐ Reset archive bits after copy
☑ Load hidden files
☑ Load system files

boot verdict

PRICE: $299
COMPANY: Elektroson
PHONE: 408.371.4895
URL: www.elektroson.com

9

"Anything your **devious** little mind can **produce** with

MICROBOARDS PLAYWRITE 2040

The best of the rest

The Microboards PlayWrite 2040 arrived late to the party and went home with the best scores. Just like that spoiled frat boy in college that drove off with my date in his daddy's Beemer. I'm not bitter or anything, just making an analogy. The 2xRead/4xWrite Ricoh drive mechanism combined with the *Gear 4.0* software blew the other drives away. It's gotta be the software, or maybe it's the shoes.

The PlayWrite is the only drive in this group available with either 1MB or 2MB data buffers, and works as a vertically mounted unit—you don't really know how cool this is until you have four or five CD-R units on your desk, stacked up on top of each other like Yertle the Turtle. The drive supports packet writing and disc creation in all the popular formats, including CD-ROM, CD-ROM XA, CD-Plus, CD-i, and CD-DA.

The PlayWrite took our on-the-fly torture test in an awe-inspiring 8 minutes. The time it took to create an ISO image file (13 minutes) was one minute off the times put in by the two 4x recorders in this roundup. It burned the ISO image file in 25 minutes, which seems to be the fastest time that any dual speed drive can pack data on a platter. It converted WAV files to audio tracks for the creation of an enhanced mode CD, and duplicated both an audio CD and a mixed-mode disc without error.

The PlayWrite 2040 is the drive that sits on my desk for those critical moments when I really need to burn a disc and don't have time to waste with recording errors. If you're looking for the same thing, check out this CD-R drive.

boot verdict

9

PRICE: $695
COMPANY: Microboards Technology
PHONE: 800.646.8881
URL: www.microboards.com

could sound the death knell for all but the highest-capacity tape backup drives.

Don't jump on the CD-RW bandwagon if you need to access those discs on garden-variety CD-ROM drives: older drives can't read the less-reflective CD-RW discs. The newest models—including DVD-ROM drives—should be able to read CD-RW discs, but that can't be verified until these devices hit the market. Before you buy *any* drive, check the manufacturers' specs for MultiRead capability: Without that, the drive won't be compatible with CD-RW.

CD-RW builds a bridge between current CD-R technology and the DVD-RAM technology that's coming down the pike. DVD-RAM, using phase change technology adapted for the increased capacity of DVD—promises to deliver gigabytes of reusable storage in the same 5.25-inch footprint. When will it be available? Well... Let's just say, Bob Hope probably won't be around to see it.

DVD-Recordable in the Mist

DVD is the next generation of digital optical disc technology, with the capacity for 25 times more data that can be accessed nine times faster than current CD technology. Used for video, it boasts twice the definition of VHS tape, with audio quality that's better than CD. With DVD-ROM's increased storage capacity, developers will be able to stuff data onto a single disc that would have consumed a dozen conventional CDs.

DVD-ROM promises backward compatibility with existing CD-ROMs, but it poses a new problem to CD-R. Because the laser in a CD-R drive is of a different wavelength than that used in a DVD-ROM drive, CD-R discs won't play in DVD-ROM drives or DVD players. Fortunately, a new blank-media standard—CD-R 2—will take care of the problem.

Daydreaming about downloading a feature-length motion picture from a digital satellite transmission, then writing it directly to disc for playback on your DVD player? Wake up! DVD-Recordable is a far-off technology. Start saving a buck a day now, and you'll probably be able to afford one when they finally ship. DVD-R promises the ability to pack 3.9GB of data on a disc you can burn at home, but you can expect the Hollywood studios to raise a holy stink about piracy before this technology reaches the market. It'll be an even bigger problem than that which delayed DVD. Don't expect DVD-R before mid-1998 at the earliest.

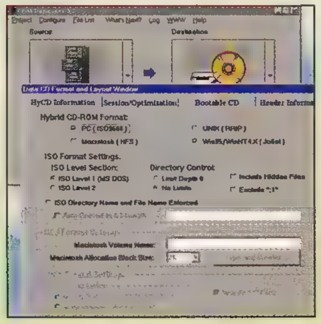
DVD-RAM, the rewritable version of DVD-R, will take even longer to get to market. It has a planned capacity of 2.6GB,

CDR PUBLISHER 4.65

If you want to burn a disc to be used on Macs, PCs, and Unix systems, this is the software to do it

Advanced features such as the ability to create hybrid and bootable CDs make *CDR Publisher 4.65* the choice for knowledgeable CD-R users. Despite a formidable following in the Unix community, *CDR Publisher* is virtually unknown to the Windows world, and that's a shame because this is one of the most powerful and unique CD mastering programs available.

CDR Publisher can adjust the buffer size and write to CD-R tape format. It's capable of premastering every CD format imaginable: CD-ROM, CD-ROM XA, CD-i, CD-DA, Enhanced CD, bootable CD-ROM, Mixed Mode, Video CD, and hybrid CDs with PC, Mac, and Unix native format volumes coexisting on a single platter. It does this in such a way that the same data is available to all platforms, instead of having to create separate data volumes in different formats. It can also create CDs for non-PC platforms on a PC.



Project Configure File List What's Next? Log WWW Help
Source
Destination
Data CD Format and Layout Window
HyCD Information
Session/Optimization
Bootable CD
Header Informa

Hybrid CD-ROM Format:
● PC (ISO9660)
○ UNIX (RRIP)
○ Macintosh (HFS)
● Win95/WinNT4.X (Joliet)

ISO Format Settings.
ISO Level Section:
● ISO Level 1 (MS DOS)
○ ISO Level 2
Directory Control:
○ Limit Depth 8
● No Limits
☐ Include Hidden Files
☐ Exclude ";1"
☐ ISO Directory Name and File Name Enforced
Macintosh Volume Name:
Macintosh Allocation Block Size:

Through speed profiles and virtual writing features, *CDR Publisher* tests the data transfer speed between PC and recorder prior to actual recording, and helps fine-tune settings to increase the chances of successful burns. It also optimizes file placement for faster data access, and auto-renames files to comply with the destination format.

The program's Unix roots give it a decidedly un-Windows-like interface, but don't let that put you off, because *CDR Publisher* has the power.

boot verdict

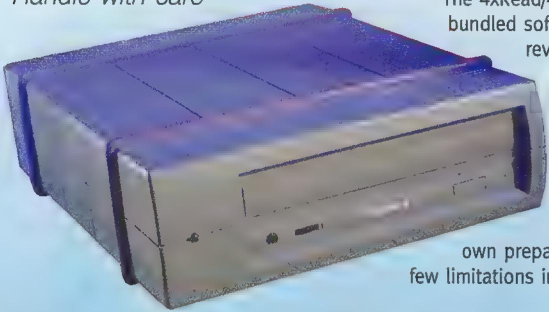
8

PRICE: $495
COMPANY: Creative Digital Research
PHONE: 408.255.0999
URL: www.cdrl.com

your **PC** can be **packed** onto a CD…"

PINNACLE MICRO RDCD 4x4

Handle with care



OK, so it has a charcoal shell wrapped up in two purple racing stripes. If it was a little thicker and had the Dukes of Hazzard on the side I would've mistaken it for my childhood lunchbox. As it was, I still checked the drive tray to see if there was a thermos inside. None of this makes the RDCD 4x4 any less of a CD-R drive. In fact this drive's 4xRead/4xWrite mechanism leaves little room for bologna sandwiches and potato chips.

With this drive you get the works: Adaptec SCSI adapter, *Easy-CD Pro* mastering software, Pinnacle Micro's *Disc Archive 95* backup software, and motivational digital video clips. Yeah… QuickTime movies of feel-good moments synched to inspirational music and positive messages are exactly what I buy a CD-R drive for.

The 4xRead/4xWrite mechanism was up to any task we put it to, but it was a little hindered by the bundled software. *Easy-CD Pro* crawled through our on-the-fly torture test in 30 minutes. (See the review of *Easy-CD Pro* for reasons why.) On the rest of the test the drive performed like a dehydrated speed freak, sucking down everything we stuck in its face. The drive created a 390MB ISO image file in 12 minutes and burned it in 13 minutes. It created WAV files from audio tracks and back to create an enhanced CD, and duplicated both audio and mixed-mode discs without error.

This is an appealing package for anyone who wants to pack all their crap onto disc. It even ships with its own prepackaged crap. It has it all, including a few limitations imposed on it by the software.

boot verdict

8

PRICE: $999
COMPANY: Pinnacle Micro
PHONE: 800.553.7070
URL: www.pinnaclemicro.com

eventually reaching 5GB in several years. It will use the same phase change technology as CD-Rewritable discs. As of now, the media for both of these new optical disc standards is ready but the drives are not.

Go Home and Cut One

CDs are inherently cool. Their reflective surfaces serve up huge quantities of graphics, animation, and video to power-hungry PC users. CDs deliver the highest quality sound available without a prescription. With CD-R, you create your own interactive worlds. Anything your devious little mind can produce with your PC can be packed onto a CD: Produce your own game, back up your hard drive, or pack your favorite album tracks into a single disc, so you'll never again have to listen to songs that suck. CD-R drives are now available for less than $500, and new mastering software makes burning CDs as easy as copying to a floppy. CD-R has arrived and it's coming to a PC near you. What are you waiting for? b

Creating a Bootable CD-ROM

You will need DiskEdit from *Norton Utilities* and *CDR Publisher.*

Try it out!
demo on the **bootDisc: CDR Publisher**

1. Create a bootable floppy.

2. Exit Windows and Launch DiskEdit:
   - Under **Object** menu, select **Drive…** option.
   - Select 'A: 3_" floppy' and 'Physical disks'.
   - Select the 'Write Object To…' option in the **Tools** menu.
   - Save it to a file on your hard drive with an .img extension.
   - Exit and return to Windows.

3. Launch *CDR Publisher.*
   - Set Source to 'File List' and Destination to 'CD Recorder'.
   - Select 'Disc Format and Layout' under the **Configure** menu and click on the **Bootable CD** tab.
   - Check 'Create PC bootable Disc', insert the Image File path and set 'Boot Media Type' to the size of diskette that was used.
   - Under **File List** menu, select **Selection** and drag the files that you would like to place on the CD directly from the Explorer.
   - If you'd like to be able to add to the disc later, select 'Multi-Session CD Interim Session' from the **Session/Optimization** tab.
   - Click **Create Image** and cut the disc!

4. The BIOS will need to be changed to enable CD-ROM booting. This is done by pressing either 'F1' or the 'Delete' key when as you are booting. Once there, locate the option that specifies the first boot device, change it from 'Floppy' to 'CD-ROM', save the configuration, and reboot. The disc should boot like a bootable floppy would; taking on the drive letter A:. You now have a non-writable 650MB gold floppy (or stiffy) disc. We haven't figured out a practical use for this yet, but we thought we'd pass it on.

How to Make a Quake CD-ROM with Carpenter's Soundtrack

The registered version of *Quake* comes on a disc that contains both computer data and Red-Book (digital) audio. It is technically referred to as a Mixed-Mode disc in which the data is all contained in Track 1, and the audio in one or more of the following tracks. The audio tracks follow the same Red Book standard that audio CDs do, which means that you can pop the disc into your stereo system and play it from track two on. This also means that you can replace the provided audio tracks with your own music, such as our personal favorite, *Greatest Hits of the Carpenters.*

All you need is multisession capable CD-R mastering software and, of course, a CD-R drive:

- Import the *Quake* data track into the CD-R software and cut it to disc. DO NOT CLOSE THE SESSION.
- Add the audio tracks. These can be added individually or all at once; it is recommended that you do the latter unless you are taking these from different sources one at a time.
- You may need to convert the audio tracks to WAV files if your CD-ROM reader doesn't support digital audio extraction.
- Set the session to be closed when adding the last audio track and bear in mind that more cannot be added later after this has been done.
- Now sit back and frag a couple of zombies to the soothin' groove of 'We've Only Just Begun'.

TIGHTEN, TRIM, AND TUCK

Your PC Into

PHOTOGRAPHY: MARK MADEO

Fighting Shape!

the **boot guide** to a leaner, meaner system

You've gone **fluffy**… make that **fat**… **bloated**… **lumpy**, even. You've slowed to a cruel parody of your former self. You're an embarrassment.

Face the truth, my sad-sack PC, you're a mess.

Fortunately, I am going to salvage your soul. I am more than your **personal trainer**.

I am your deliverance. With a small investment of **money** and **effort**, you and I are going to push back the hands of time. We're going to return your **speed** and **power** and awe-inspiring **vitality**. You will thank me for it, just as I thank you in my heart for the work you help move off my desk every day.

BY MARTY JEROME

The Slimfast Diet Plan

The first stop on the road to rehab is the de-flabifier. With hard drives costing pennies per megabyte, useless programs and files collect like unwanted pounds on a pastry chef's fanny. In all likelihood, half of what's on your hard drive at this very moment could be jettisoned without your even knowing it. The more clutter Windows contends with, the slower it runs. It's time to take inventory.

Begin with programs—the bigger, the better. Office suites, for example, are the worst offenders where flab is concerned. If you use a suite, consider which modules are genuinely beneficial. Can you live without that database, that graphics program, or some other component? If so, you can often free up 20MB or more of space. All three major office suites let you customize the installation. This might mean deleting the entire caboodle, then reinstalling it.

There are even parts of your operating system that you probably don't need. When was the last time you fired up Visual Basic? How useful is Microsoft Network to you? Let's not even talk about *Solitaire* or half the applets in the Accessories group (Phone Dialer, Cardfile, Character Map?). Time wasters, all—throw them overboard.

Now size up your catalog of games. Would you like your office colleagues to know you still play the DOS version of *Carmen San Diego*? Hasn't the thrill gone out of *Tank Platoon Commander* by now? Games that lose their novelty tend to collect dust. Flush 'em. As long as you have the original diskettes (or backup copies), you

System
SHAPE UP 2000

can always reinstall them when you find yourself snowed in with your in-laws for a week.

Shareware and other utilities should face similar scrutiny. Often as not, they were installed to help out with a single project, never to be touched again. Worse, they may poorly duplicate other, more advanced programs you've subsequently installed on your hard drive.

A Tighten, Trim and Tuck Tip

Of course, you can always buy a third-party deinstaller, such as MicroHelp's *UnInstaller 3.5*, Quarterdeck's *CleanSweep 95*, or Vertisoft's *Remove-It*. All three work best when running during installation, because they monitor where stray files try to burrow themselves onto your hard drive. But even after the fact, all three make diligent attempts to clean up your WIN.INI and SYSTEM.INI files of detritus. They hunt for stray DLLs. They're worlds better than Microsoft's Remove Wizard. And they'll delete Windows 3.x programs as well as DOS applications. All three cost well under $50 and are worth every penny—especially if you add and delete programs from your hard drive more often than you vacuum your living room.

A utility bereft of its utility should be banished to a floppy, if not the ether. Some good candidates: last year's tax package (tax laws change every year), screen savers, noise makers, drawing and charting applets, screen-capture utilities, video and cursor controls (use the utilities provided by Windows), and leftover DOS enhancers of any kind.

Shed Pounds... While You Clean House!

Of course, getting rid of a program isn't as easy as dumping a dull date. Windows applications leave their fingerprints all over your hard drive, stuffing DLL and VBX files in all manner of folders, creating an infuriating mess. Some programs courteously come with deinstall utilities (as imperfect as they might be). You may have to mop up after running the deinstall, but use these first. Such utilities are far and away the best way to deep-six those unwanted pounds.

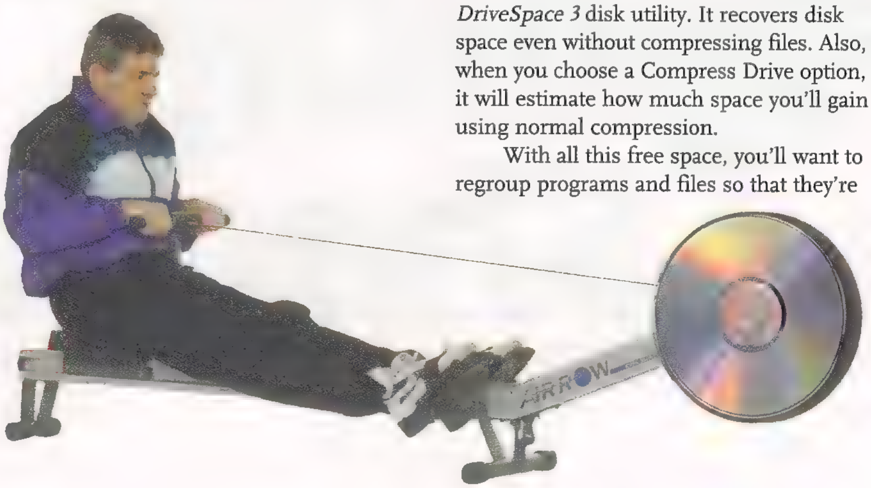
Win95 has its own Add/Remove Wizard (in the Control Panel), but it works only with Win95 applications—and it's a finicky little brat. If a DLL even *looks* like it might be shared by more than one application, the Wizard refuses to delete it and the whole uninstall show comes to a stop. Likewise, if program files have been moved or manually erased, it confuses the Wizard, which in turn refuses to cooperate. You'll have to ferret out these DLLs yourself, then manually delete them.

Seeing a Faster, Thinner You Through Clean Windows

When the dust finally settles from all this program purging, reinstall Windows. It's remarkably painless, and the process wipes away a lot of the stowaways, gremlins, and freeloading files that you and your uninstall software weren't able to catch. You may see as much as a 10 percent improvement in system performance from this modest act alone.

But before you break out the bubbly, you'll also want to purge or archive data files. (We won't lie: This is utter drudgery. It's akin to cleaning out an attic where an eccentric uncle has lived for the last 30 years.) A few tips and tricks can minimize the toil, but the process requires a lot of nit-picking labor.

First, separate the files that utterly deserve to die. Using Win95's File Find utility, scour your hard drive for porky JPGs, many of which will be hiding in your web browser's cache (*what* would your mother say?). Dispatch them. Most likely you'll find these large files scattered across other directories as well, since nothing trashes up a hard drive quite like the Internet.



A Tighten, Trim and Tuck Tip

Use your web browser to quickly view and delete the jetsam it has congested your pride and joy with. If you are still using Windows 3.x, you'll have to smoke them out the old fashioned way... using File Manager.

Most multimedia files should also get the heave-ho, unless you have a compelling reason to keep them. First, clear out WAV files—including the annoying chirps and chimes Microsoft packages with its operating systems. Then look for MIDI, AVI, and MPG files. Goodbye. With these gone, you can size up wallpaper and font files. Do you really need more than a few typefaces? If not, click on Fonts in Control Panel, and start deleting. Also, if you change your wallpaper more than a few times a year, maybe it's time to take up a hobby instead.

Consider the Liposuction Option

When your drive has been liberated of this dead wood, you'll want to consider archiving old files to free up even more real estate. There are several ways to do this. Two of the best: invest in a Zip drive (which makes a fast, unobtrusive backup tool in the bargain), or use a compression utility, such as Cheyenne Software's *Infinite Disk* for Win95.

Zip drives are painless to install, their cartridges are cheap (about $25 for 100MB), and drive performance is relatively fast. Also, they make your data portable, so you can keep copies of your archive at multiple locations, which protects against disaster. It is an ideal solution if you are still pinched for drive space after all the pruning you've done.

If you've bought (or plan to buy) the Microsoft Plus CD, you'll be treated to the *DriveSpace 3* disk utility. It recovers disk space even without compressing files. Also, when you choose a Compress Drive option, it will estimate how much space you'll gain using normal compression.

With all this free space, you'll want to regroup programs and files so that they're

A TIGHTEN, TRIM AND TUCK TIP

Infinite Disk, another compression utility, will squash files you no longer need. Alternatively, you can have it automatically compress files that haven't been touched in a specified number of days—or even have it compress different file types after a specified number of days. After this data has been compressed, you can migrate it to a backup storage device, including a Jaz or Zip drive. All files that have been migrated or compressed appear to remain where they had previously been on your drive. When you click on the icon for the file, the program automatically decompresses it, or prompts you to insert the disk or tape where the compressed file resides. It's one of the best compression utilities you'll find.

close together. Defragging your hard drive ensures that read/write heads won't have to jump all over the disk's platter to find data. In Win95, click on Start, Programs, Accessories, System Tools, then Disk Defragmenter. The OS will do the rest. In Windows 3.x, exit and type SCANDISK at your C:\ prompt. Depending on the size of your drive, the process will take anywhere from five to 20 minutes. Consider it tea time.

Enhance Your Memory... for Free!

With your hard drive lean and fast, you'll then want to turn your attention to tuning Windows itself. The fastest way to put the pedal to the floor is to make sure the OS is stoked with enough memory. Forget Microsoft's 8MB requirement for Win95 and 4MB for Windows 3.X. You'll want double that amount in both cases. Unfortunately, this can be expensive.

Fortunately, there are cheap alternatives. In fact, two cost nothing at all. In Win95, you can boost performance by minimizing the amount of disk-to-memory swaps the OS performs. How? Reduce the upper limit of your disk cache, which grows and shrinks according to the demands of the applications you're running. In most cases, a large cache steals memory that the OS could use for faster application performance. You can artificially limit your disk cache by inserting two lines in your SYSTEM.INI file, under the vcache heading (if your SYSTEM.INI file doesn't have a vcache section, create one):

```
MinFileCache=0
MaxFileCache=4096
```

Remember to save these changes and reboot your system for the additions to take effect. These settings may require some tinkering. For example, if you run lots of large databases or resource-hungry applications such as Adobe's *Photoshop*, they could actually hinder performance. Should your system become noticeably lethargic, simply erase these settings, save the file, then reboot.

Also, make sure your disk cache is tweaked for optimum performance. Click on Control Panel's System icon, then click on File System. Select the Performance tab. Make sure the setting suits your computer's role: a notebook allocates the least amount of memory to caching (in order to preserve battery life); a server allocates the most (for transaction processing). Desktop systems fall between the two. A little fiddling with these settings can mean a world of difference.

For Windows 3.x, you'll want to increase the size of your swap file for better performance. In Control Panel, click on the 386 Enhanced icon. Select the Virtual Memory button. Make sure the permanent swap file option is on. Windows will recommend a size for your swap file, though you can override it with your own. Generally speaking, the bigger the better, though any swap file larger than 16MB is pretty much a waste. Before you leave the Virtual Memory dialog box, make sure the 32-Bit Disk Access box is checked. Now reboot your system.

You can also give yourself a boost in both Windows 3.x and DOS applications by using SmartDrive, the disk cache that Microsoft provides with its operating systems. Simply add a line in your AUTOEXEC.BAT file that begins with SMARTDRV, followed by a space and the amount of extended memory you wish to allocate to the cache. Follow this with another space, and type in the amount you wish to allocate to Windows. To give 1MB to DOS and 2MB to Windows, you'd add the following line:

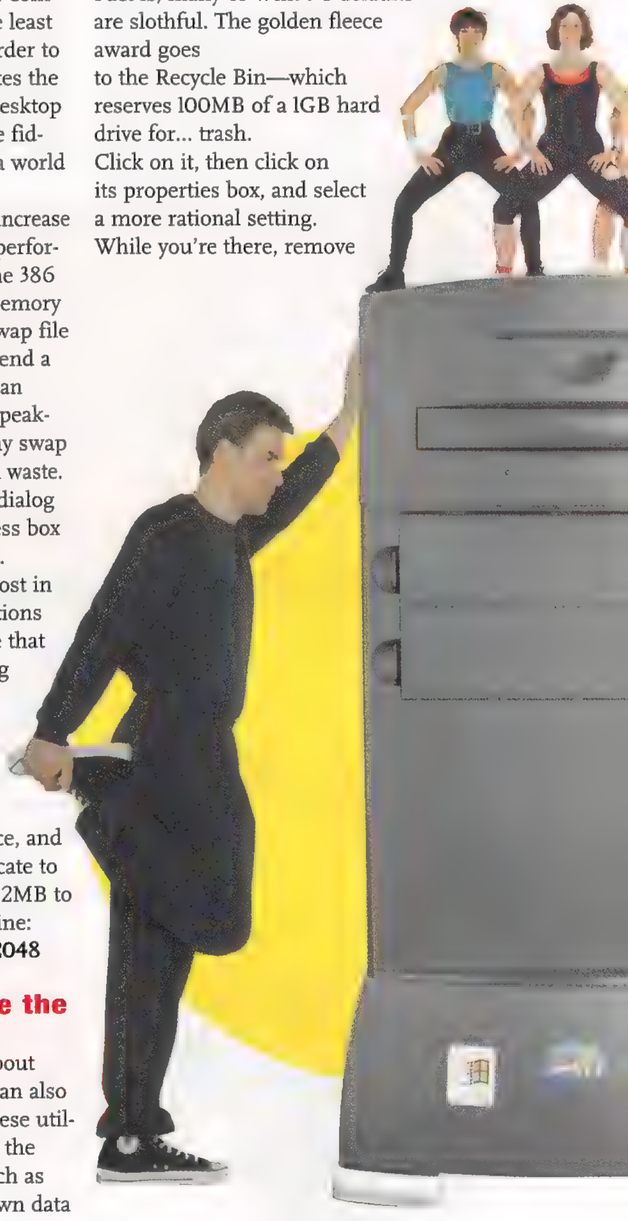
```
C:\WINDOWS\SMARTDRV 1024 2048
```

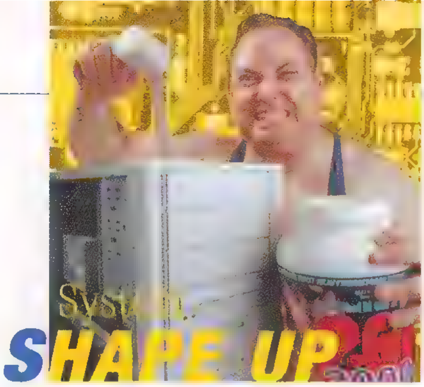
Squeeze, Squeeze, Squeeze the Pounds Away!

If you're willing to make a small (about $50) investment, a memory utility can also spur system throughput. Most of these utilities compress data into RAM chips the same way that disk compressors such as *Stacker* and *DriveSpace* squeeze down data on your hard drive. Other's simply manage your system's memory better. Operating systems selfishly reserve memory blocks for their own use. Most of the time, these blocks sit idle. A good memory utility puts them to work. But they're not a magic bullet. Big graphics and multimedia programs won't get much use from them. They can occasionally create conflicts with your utilities and device drivers. And they ironically take up as much as 1MB of RAM on their own. Still, you can see as much as a 20 percent increase in system vroom—especially with meat-and-potato business apps, such as spreadsheets and word processors.

Maximize Your Speed Potential!

Fact is, many of Win95's defaults are slothful. The golden fleece award goes to the Recycle Bin—which reserves 100MB of a 1GB hard drive for... trash. Click on it, then click on its properties box, and select a more rational setting. While you're there, remove





the check from the box inscrutably labeled Display Delete Confirmation Dialog. This will keep the utility from nagging you like a hungry cat every time you nix a file.

There are other places to tweak as well. Win95 doesn't always correctly guess the speed of your CD-ROM drive—especially if it performs at the top of its class.

Meanwhile, no system component drags performance down as much as sluggish video. Shy of upgrading to a faster card (adding more video memory increases colors, not speed), your best bet is to upgrade your card's driver. Video card manufacturers are constantly working on faster drivers. Usually speaking, they're free for the downloading. It's worth a phone call or a visit to the company's web site. The same is true for printers, scanners, and other peripherals.

A Tighten, Trim and Tuck TIP

Regardless of its speed, go to the File System Properties box, click the CD-ROM tab, and choose a faster setting in the Optimize box. Also, you may want to bump up your CD-ROM drive's cache for better performance when playing multimedia files. Drag the Supplemental cache size slider all the way to the right.

You can also goad video along by turning off the animation displayed when you minimize and maximize windows. As animation continues to suffuse everything from databases and CAD programs to sing-along CDs, the net performance effect may be larger than you think. First back-up Win95's registry files as a precaution. Then click on Start, Run, and type REGEDIT. Click on OK, and go to HKEYCURRENT-USER\Control Panel\desktop\Window Metrics folder. Right-click on an empty area in the right-hand pane, and select New String Value. Name the new object MinAnimate. Double click the object, and enter the value 0. Now exit RegEdit and restart Windows. The performance gains should astound you.

A Tighten, Trim and Tuck TIP

Helix's *Hurricane 2.0* and Connectix's *Agent 95* are two of the best memory utilities for Win95. *Hurricane* ferrets out every scrap of unused memory—not just from conventional RAM, but also from your video card's memory—which it converts to regular system RAM. *Agent 95* compresses information already loaded into your physical RAM, so your system uses slower virtual memory less often. There's a version of *Hurricane* for Windows 3.x as well. A central control panel program lets you tinker with virtually every memory setting imaginable. For example, you can have it create a RAM drive that works cooperatively with Windows' swap files (thereby speeding up application performance), create a print cache so that you don't have to wait for print jobs to finish before you resume typing, or set it up to accelerate Windows' video.

And Remember to Always Eat Healthy

If there's any single trick to wringing more performance from the box on your desk, it's to abandon a 16-bit world in favor of a 32-bit world—beginning with your operating system. When you multitask a

► 54

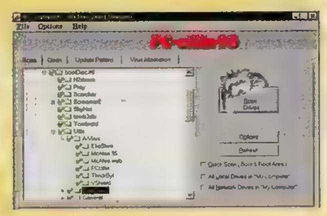
Welcome to

The utilities on this month's disc do more to trim your computer's **flab** than liposuction—and the *bootDisc* is a hell of a lot cheaper too! We've packed more than **100MB** of utilities, tools, and updates. These will not only help you **diagnose** problems you may already have, but will also **increase** your machine's performance, productivity and usability. We have apps that'll **clean** out unnecessary files and **eradicate** and **protect** against viruses, and we even have encryption software for you **paranoid** types. We've lumped them into the following categories: Anti-Virus, Compression, MultiMedia, Online, Security, Updates, and one fat General folder; a total of more than **60** applications for your perusing **pleasure**. You just can't find this amount of software anywhere else. You bought the mag, now use the software!

the bootDisc Juicebar!

Anti-Virus

- VirуSafe 95
- VirusScan 95
- VShield 95
- WebScan

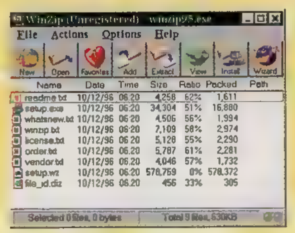

File Options Help
PC-cillin95

PC-cillin 95**—Is your hard drive experiencing that burning sensation? A shot of *PC-cillin 95*'s easy-to-use advanced virus protection will clear that up right away. Bend over and say ahh.**

ThunderBYTE 95

Compression

- Clone Master
- InterBack
- Kappel Backup
- PKZIP 95
- Waste 95
- WinPack 32 Deluxe
- WinRAR


WinZip (Unregistered) - winzip95.exe
File Actions Options Help
New Open Favorites Add Extract View Install Wizard

```
Name          Date     Time   Size     Ratio Packed   Path
readme.txt    10/12/96 06:20    4,258  62%     1,611
setup.exe     10/12/96 06:20   34,304  51%    16,880
whatsnew.txt  10/12/96 06:20    4,506  56%     1,994
winzip.txt    10/12/96 06:20    7,109  58%     2,974
license.txt   10/12/96 06:20    5,128  55%     2,290
order.txt     10/12/96 06:20    5,787  61%     2,281
vendor.txt    10/12/96 06:20    4,046  57%     1,732
setup.wz      10/12/96 06:20  578,759   0%   578,372
file_id.diz   10/12/96 06:20      456  33%       305
Selected 0 files, 0 bytes        Total 9 files, 630KB
```

WinZip 95**—Compress your files with the most popular Win95 compression utility. Nico Mak's packed this new version with more features than ever.**

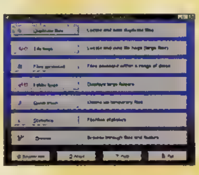
Zip Explorer Pro

General

- AutoMate Professional
- CD-Quick Cache 95
- CDR Publisher

CleanSweep 95**—Clean out all of the excess flotsam and jetsam from your hard drive.**

- ClipMate 95
- DeskView32
- DIR3d
- EzDesk
- Gear



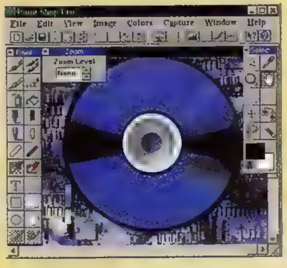
More-Space 32**—Allows you to groom your hard drive and free-up valuable space by locating file hogs and duplicates. Now for that keyboard manicure…**

Updates

- EzSCSI Update
- Win95 Service Pack

Multimedia

- Grouper
- Microangelo
- Crash Guard
- PowerDesk
- PowerStrip
- QuickView Plus 95
- SmartBoard
- Uninstaller
- ACDSee95!
- EasyCD
- EZ-Viewer 32
- RADFind 96
- GoldWave
- HyperSnap
- IconEdit Pro
- GIF Construction Set

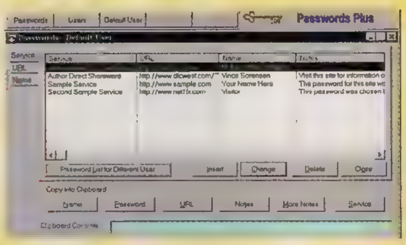

Paint Shop Pro
File Edit View Image Colors Capture Window Help
Zoom
Zoom Level
None

Paint Shop Pro**—This is one of the coolest image editing apps out there. The combination of handy toolbars and advanced effects make this almost as powerful as that other image editing program that starts with a 'P' and ends with 'shop'.**

- Image Composer
- GIF Animator
- Quant
- SmartDraw 95
- ThumbsPlus!
- Video Launch Pad

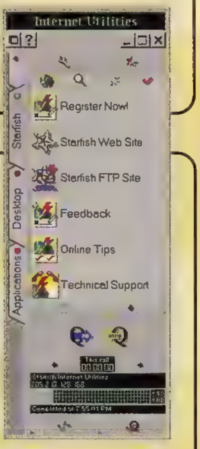
Security

- 007 for Win32
- Acrypt 95
- Crypt-o-Text 32
- Magic Folders


Passwords
Users
Default User
Passwords Plus
Passwords - Default User
Service
URL
Name
Password List for Different User
Insert
Change
Delete
Close
Copy into Clipboard
Name
Password
URL
Notes
More Notes
Service
Clipboard Contents

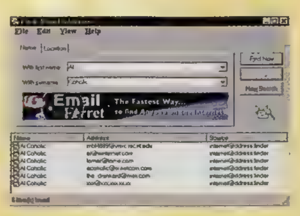
Passwords Plus**—This is handier than a slimjack when your keys are locked in the car. It creates a password protected list of all your passwords. If you forget the password to this list, then it's time to call AAA.**

- Surveillance Agent
- WinU


Internet Utilities
Register Now!
Starfish Web Site
Starfish FTP Site
Feedback
Online Tips
Technical Support
Starfish
Desktop
Applications

Online

- Arachnophilia
- CuteFTP 32


File Edit View Help
Email Ferret
The Fastest Way...
Name
Address
Source

EMail Ferret**—Find any publicly accessible e-mail address with this Internet search tool. We used it to find new drinking buddies.**

- Free Agent
- HTML Library
- Internet Explorer 3.01 for Win 3.1 and Win95
- WsFTP 95

Internet Utilities**—Companionship for your online activities: bookmark management, enhanced online communication monitoring, and web page update notification. You'll never be lonely again.**

A TIGHTEN, TRIM AND TUCK TIP

All the performance gains in the world do little good if the whole caboodle screeches to a halt because of the venal hands of a virus. As you upgrade programs and drivers and add memory utilities and other tools, you'll want an up-to-date scanner keeping watch. Two of the best: *PC-cillin 95* and *Norton AntiVirus*. The former is astonishingly thorough at wheedling out rogue code (including the ubiquitous Concept Virus). *Norton's* gets high marks for its genteel interface and no-nonsense scanner. Make sure you update them regularly.

16-bit application with a 32-bit program, you pay twice the performance penalty. Win95 multitasks 32-bit applications preemptively, meaning it controls which program feeds instructions to your processor at any given time. Sixteen-bit programs multitask cooperatively. In other words, they commandeer the CPU, relinquishing control of it at their lordly leisure. Meanwhile, the other apps in memory can only drum their fingers.

The world is awash with namby-pamby 16-bit fax applets, games, and other utilities. Even Win95 itself is chockablock with 16-bit code, which it retains for backward compatibility with Windows 3.x. All of these undercut the capabilities of a 32-bit processor. Promise yourself you won't collaborate. Competitive software upgrades abound. And if your favorite program hasn't released a 32-bit version, its competitor probably has. Rethink your loyalties.

Of course, mileage will vary with all of these tips and techniques. System performance changes with each clock cycle, each click on your keyboard. Perform-ance depends not only on the types of applications you run, but how you run them. Those who make heavy use of multitasking will get different results than those who run only one resource-devouring application at a time.

The only guarantee we can make is this: Everyone needs to set aside the time to get their PC into shape. The effort invested pays off in better performance and a longer, healthier life. After all, if you haven't got your health, what have you got? ▮

We won't **lie**: This is **drudgery**. It's akin to **cleaning** out an attic where an **eccentric** uncle has lived for the **last** 30 years.

SHOPPING LIST

A TIGHTEN, TRIM AND TUCK TIP

Agent 95
$59
Connectix Corp.
800.571.7558
www.connectix.com

Hurricane 2.0
$59
Helix Software
800.451.0551
www.helixsoftware.com

Infinite Disk for Windows 95 1.0
$79
Cheyenne Software
800.243.9462
www.cheyenne.com

Norton Antivirus for Windows 95
$79.95
Symantec Corp.
800.441.7234symantec.com

PC-cillin 95
$49.95
TouchStone Software
800.932.5566
www.antivirus.com

Quarterdeck CleanSweep 95 2.0
$39.95
Quarterdeck Systems
800.683.6696
www.quarterdeck.com

UnInstaller 3.5
$39.95
MicroHelp
800.777.3322
www.microhelp.com

Zip Drive
$199
Iomega Corp.
800.456.5522
www.iomega.com

WE KNOW HOW YOU ARE GOING TO DIE

they never attack in hor... seen in

"The Vanguard of a terrifying new level of immersive technology."

no early
prospe
secret c
rife the
to appe
of *Doo*
were
had tro
order to

—COMPUTER GAMING WORLD

when a
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h a
een
our

his
by the lightning

"...by far the most addictive, multiplayer action game we've ever played."

Quake's greatest addition ... levels
feature some form
which
If you

— PC MAGAZINE

furious as it
Deathma... ever was in *Doom*, but much harder. In fact, if
be disappointed th... shots

"Quake overwhelms the senses."

—USA TODAY

world is
run so slowly. But, thank... Universe ... enemy departme

"Quake is the biggest, baddest, bloodiest and most atmospheric 3-D action game ever conceived."

—PC GAMER

gameplay, *Total Mania* is
on the bigger levels there's more ... ring than robot-shooting, which, let's fa

"Quake is the most satisfying first-person action game of all time."

— BOOT MAGAZINE

that you can target an enemy robot and fire at it
because these can be sold when you get back
converted into valuable credits.
terra
Total
emph
add

www.idsoftware.com

Distributed by
GT Interactive Software
www.gtinteractive.com

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Product Information Number 152

QUAKE
full registered version
now available.

the boot 12-step program

DEALING WITH YOUR
PC **OBSESSION**
DAY TO DAY
BY BREAKING IT DOWN
INTO 12 **EASY** STEPS

this month:

How to Be a Super 3D Modeler

Ever since you saw *The Last Starfighter* when you were a kid, you've dreamed of bringing the intergalactic epic of your imagination to the screen. Every episode of *Babylon 5* only serves to make your yearning stronger. Well, quit whining and get to it! Within the confines of this month's 12-Step Program is your path to making those dreams a reality. Whereas 3D modeling used to be so complex it induced aneurysms just thinking about trying it, today's bleeding-edge apps are so advanced that any Joe off the street can make 3D models, just like the pros. The NURBS-based models you create in *Rhino3D* can be exported into almost any 3D animation program and combined with all kinds of other stuff... other objects, sound effects, titling, intercut FMV, whatever. Next thing you know, George and the boys at ILM will be calling you for tips. Just don't forget who got you started...

— Mike Brittman and Christina Davis

1 Point of View

There are three **viewports** that you will normally be working with in *Rhino3D*. They're Top, Front, and Perspective, (kind of up and to one side). You can create in any of the viewports; and using more than one at a time is often necessary for positioning objects and such.

The red, green, and blue lines, (blue unseen on the grid), represent the **x, y, and z axis**, respectively.

2 Button, Button, Who's Got the Button

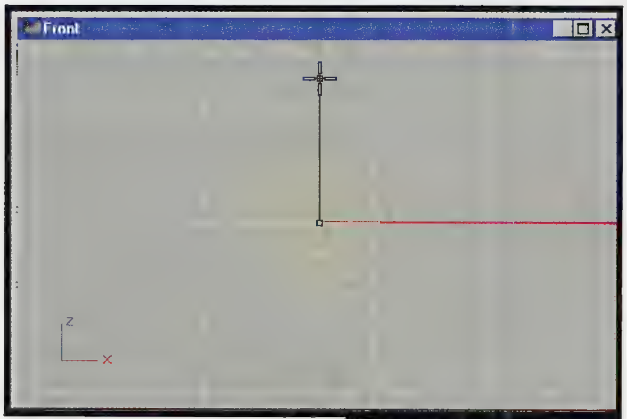
Across the top of the *Rhino3D* interface is the first set of buttons. You'll recognize these from, oh, just about everything (new, save etc.). Continuing to the right are the view control buttons (fancy zooms), select, and render buttons.

Down the side are the basic building materials for your 3D modeling needs: points, lines, curves, planes and solids. Continuing down are the object manipulating tools: sizing, copying, rotating, yadda yadda yadda.

3 Splinter of the Mind's Eye

Decide exactly *what* you want to create. Doodling tends to lead to lots of spheres which lead, inevitably to snowmen; not that there's anything wrong with that. All we're saying is, start with a vague idea of what you want to create before you begin. We've decided on a spaceship, (to add to our resume for Digital Domain), but you can make (almost) anything you can think of.

Try it out!
demo on the bootDisc
Rhino3D
We've provided an exclusive version of the *Rhino3D* application on this month's *bootDisc* so you can follow along and try out your own ideas.



⑤ From the Front viewport, prepare to squish your object.

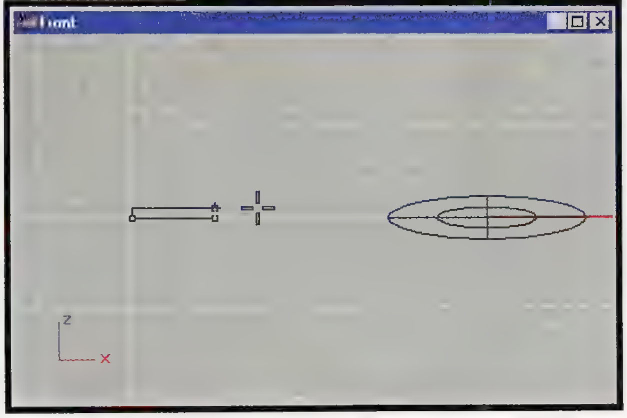
4 Stuff to Keep in Mind

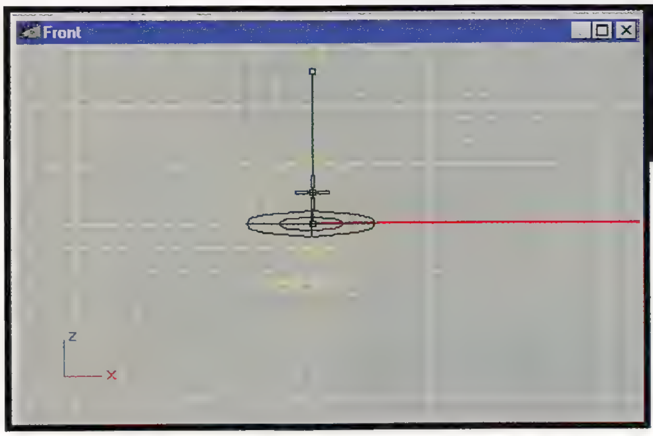
Keep an eye on the **Command Line**—it can be *very* useful. For instance, if you are trying to rotate an object but it's just highlighting and not actually rotating, the Command Line will tell you to select an object and hit enter before you can continue.

Creating and modifying objects often requires multiple clicks on **multiple planes.** Before you move on to the next task, make sure you aren't still in a **crosshair mode.** This means that you haven't finished doing the last task yet.

If at any time you want to pan across your viewport, hit the right mouse button to turn your cursor into a hand and pan away. If at any time you get so far away from everything that you have no idea how to get back, type **ZEA** (for **Zoom Extents All**) and hit enter. Your model will be front and center again in all viewports.

Size does matter when it comes to 3D modeling. ⑥ Be sure to make the square thinner than the cone—it'll help later.





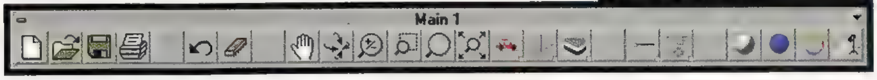
⑤ Once preliminary lines are drawn, you have complete control to squish at will.

5 Makin' It

Click on the **Solid menu icon** (the box). A box should cascade open. Choose the **Cone** and the cursor will change to crosshairs. Click in the Top viewport. This will select the center of the object, in this case, the base of the cone. The second click locates the **radius** and the third determines the **cone point.** Congratulations, you have placed your first 3D object!

Find the **Transform button** (if you're strapped for time, go to the menu bar and find it under Transform). Choose **Stretch.** Select the cone (highlight it) in the front viewport, and hit Enter. Click once in the middle of the cone and once above in the same line.

Don't panic! This creates a **ghost** of your object, which you can reshape from this point. **Squish** the cone, (stop laughing!) and click a third time. This will restore your object to its new shape.



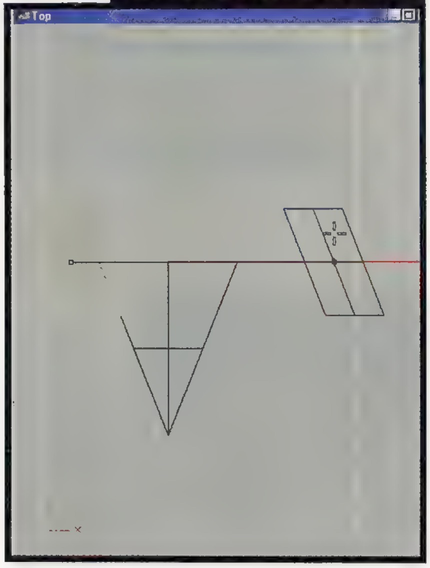
This handy toolbar contains all the useful commands. You can even tear it off and stick it anywhere you want to—on the desktop of course.

7 Ain't Nothin' but the Other Wing

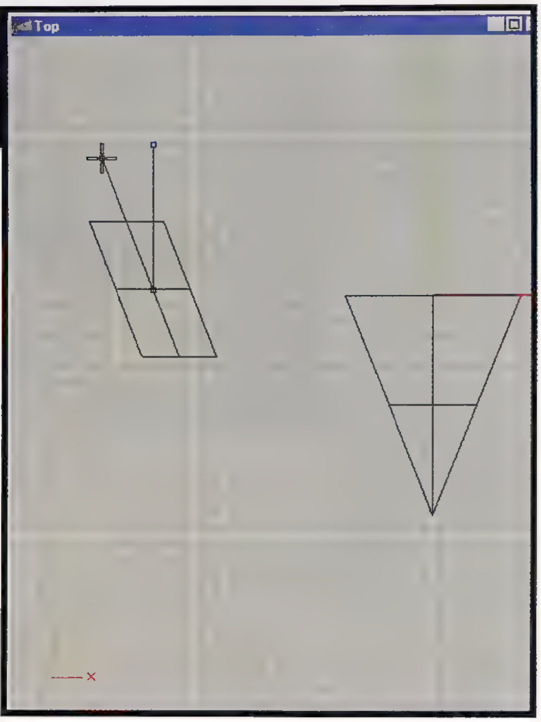
Select the wing and click the **Copy button**. Now, click the center point on the rhombus. Move the mouse to the right to pick up the ghost. Click it in the location of the new wing and hit escape. Phew!

Select the new wing and right click the **Rotate button** (to rotate in 3D instead of 2D). In the Top viewport click once on the wing, once above it in the same line, and once to the left. In the Front viewport, rotate the wing 180° and click when in position. Move the second wing into place.

⑦ Once you have your object in its new final position, click once and hit Escape to stop the copy process.



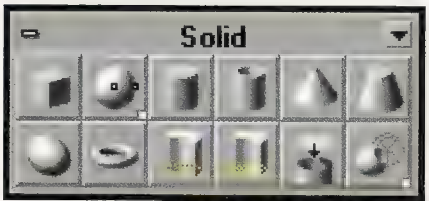
⑥ The angle should be as close as possible to the one on the cone.



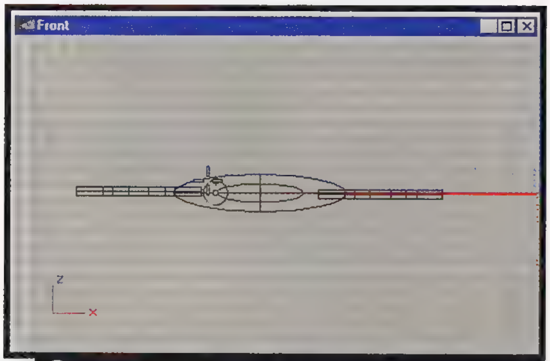
6 Ain't Nothin' but a Chicken Wing

Click on the Solid menu icon and select a box. In the Top viewport click once to start. The first click is the first corner, the second establishes the opposite corner. Move the mouse to the Front viewport and select the height, (make it fairly thin).

Click on the Transform button and select **Shear**. Click once in the middle of the square, once right over it in the same line, and move the mouse to the left. The ghost object will change shape to a **rhombus** (remember high school geometry?). Shear it to match the angle of your cone (no offense). Move your wing in place against the cone.



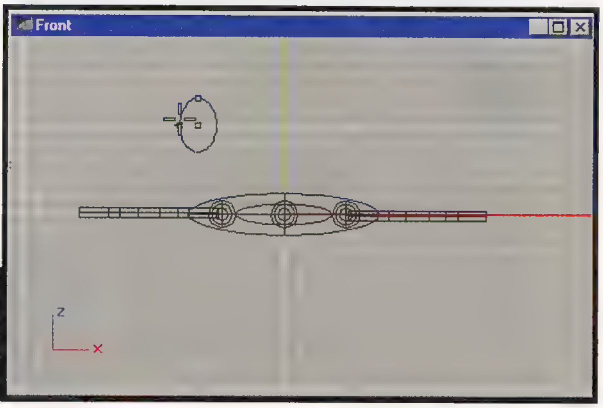
Solid primitives include box, sphere, cylinder, tube, cone, torus, and pitted olives.



⑧ When making the turbines (truncated cones), make sure not to make the bases of them too big. They need to be smaller than the rest of the ship so they don't stick out on top.

8 Turbintine

Go to the Solid menu and select **Truncated Cone**. Create the base of the cone in the Front viewport to size up against the spaceship's body. You can select the size of the small end of the Truncated Cone from here as well. Then, in the Top viewport, select the length. Once you've done that, place it against the ship. Copy it twice in the Top viewport and place the new turbine engines against the ship.

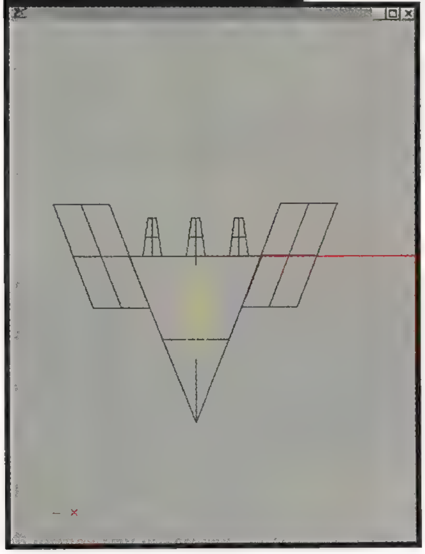


⑨ Don't make the Ellipsoid longer than the cone—it's only supposed to stick out of the top of the ship and not the bottom.

9 And For My Next Trick...

Go back to the solid menu. Select **Ellipsoid**. Make your first, second, and third clicks in the Front viewport. The fourth is made in the Top viewport to adjust the length and to move it into place.

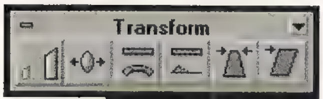
⑨ Stretch and line up the Ellipsoid to the middle of the ship in the Top viewport for more accurate placement.



10 Sniffing Glue

Right now, the computer still sees this as a bunch of separate geometric shapes. What you need to do is tell it that these shapes come together as one.

Go to the Solid menu and select **Subtract** and hold the button down until **Boolean Options** (I'm not kidding), pop out. Then click on Add. As the command line at the top will tell you, select the first object (the cone), and the second object (the wing). Now repeat the process with each of the different objects until all the pieces are glued together.

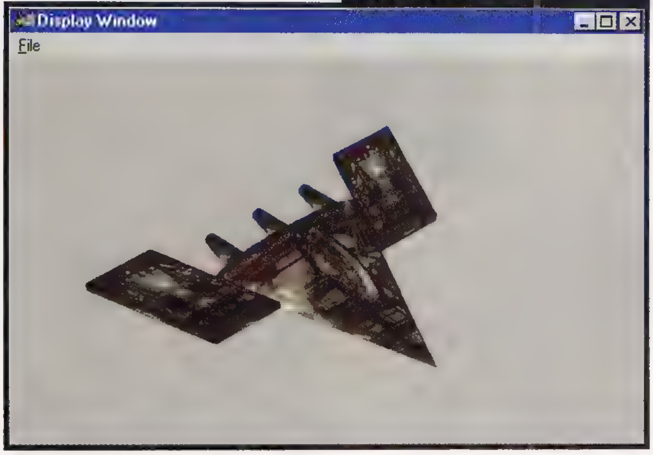


This is where the streching, bending, twisting, and squishing occurs.

11 Render Sez Me

Select the ship in the **Perspective viewport**. Then, click on the **Object Color button** and select **texture**. Go to the Win95 directory and select any BMP file. While still in the Perspective viewport, hit the blue **Render button** and wait. Depending on your machine's speed, at this point you may want to go to the bathroom, get something to drink, start making out with your dog, whatever... it could be a while.

⑪ Here's an example of what your spaceship may look like, depending on which bitmap texture you apply on your model.



12 Get into the Export Business

Take your cool spaceship and import it into any 3D animation program. Make it zip, zoom, or boogie, whatever. Now that you know how the guys at Pixar do it, you can rule the world like a god! Or at least create an on-screen world in your own image.

boot clinic

Networking shortcut

I was reading your article about networking DOS in *boot* 04. Instead of going through the hassle of LSL, your NIC driver, NET.CFG, and IPXODI; Win95 DOS mode lets you use the current Windows' network settings with a cool little command:

```
net
```

It takes only two commands to network in DOS.

```
net init
```

and

```
net start nwlink
```

It works great. (I just wouldn't recommend using it in combination with other machines using IPXODI.)

If you want, it even lets you use shared resources in MSDOS mode without having a Netware server. Type `net /?` at the command prompt to find out more!

Brian L

Girlfriend problems

As a programmer, I've spent many an hour upgrading/repairing my PC with friends, so I instantly fell in love with your how-to articles.

I recently had a problem: It seemed my girlfriend's hard drive was filled to capacity, so I was going to upgrade it. However, when I tried copying the files directly over from her hard drive to the new drive, Win95 no longer worked properly. The closest I got was a register error. There must be an easier way to upgrade the drive.

Jay Foster

Tech Editor Chris Dunphy replies: *A straight copy won't work, because there are hidden and special files that Windows depends on. You'd have better luck using a backup program to do the transfer. But honestly, you are better off reinstalling Windows from scratch, reinstalling all the applications your girlfriend still uses, and then copying over only her data files. System stability will be much enhanced by a clean reinstall every so often.*

I'm a big fan

I'm a mechanical engineering student from the C64 and Amiga days, hence I've been messing around with computers for quite a while. First of all, your mag is the finest of literature.

Second, I have a P90 with 16MB of RAM, and my motherboard will support up to 200MHz. Now, is it possible for me to remove the P90 CPU and add an MMX CPU when it comes out? Or would it require a new motherboard? Granted, I'd have to adjust the jumpers on the motherboard. Will I need a new fan? Would a P90 fan cool the CPU when used with a 166MHz CPU? I really need your feedback.

Alexy Yessayan

Associate Disc Editor Sean Cleveland replies: *You were smart to get a motherboard that supports such a high CPU megahertz rating, but is it new enough to support 2.5volt CPUs? The new MMX CPU runs at 2.5volts, as opposed to current Pentiums that run at 3.3volts. If your motherboard supports this, you will not need to upgrade. The only difference between the current Pentiums and the MMX Pentiums is internal software and a bigger cache. You will not have to buy a new motherboard when you get your new MMX CPU, because the only difference between them is a rewriting of the internal software instruction set that your software calls from them.*

As for the fan, I can't really say. Your current fan would probably do fine but it may not even be needed as MMX chips supposedly run at a lower temperature. (However, we've touched the ones we have and they felt damn hot. That may all change when production MMX chips are released.)

Put yourself in my position

I have a few "quick" questions about processors, motherboards, 3D accelerators, and the upcoming MMX upgrade.

1. Do you feel that now is a good time to buy a PC, or would you wait a few months for enhanced motherboard stuff such as FireWire?

I know that USB is already present in some computers, but are any other motherboard upgrades truly worth waiting for?

2. When do you expect an MMX Pentium Pro to hit the shelves, and would a Pentium Pro 200 that I purchase today be upgradeable to MMX? (i.e. Is it possible to add an "MMX overdrive"?)

3. Do you think the Voodoo-based 3D accelerators' inability to handle partial-screen 3D is a real liability?

The bottom line: putting yourself in the position of someone who buys a new, high-end computer about every 1.5 years, is now a good time to buy?

Joe Grant Bell

News Editor Bryan Del Rizzo replies: *Personally, I'd wait a few months for new technologies such as MMX, USB, and Klamath, to become more saturated.*

According to manufacturers, MMX Pentium Pro systems won't be available until very late 1997. To upgrade a P-Pro 200 to MMX, ensure your motherboard is MMX ready, and Socket 8 compatible. If so, you'll be able to purchase a P-Pro Overdrive Chip (with MMX technology). Look for a preview of Klamath and future CPU technology in next month's boot.

As for the Voodoo, not every software application will need to run with a full screen (i.e. AutoCAD, VRML), so yes, it's a liability. And guess what? The Voodoo Rush chipset (announced at Fall Comdex '96) eliminates this restriction, and will be integrated into 2D video cards to provide a robust, 2D/3D Voodoo-compatible solution.

Are 2 better than 1?

I am planning to build my own screaming fast PC, but have questions regarding the motherboard. A Pentium 200 and motherboard is $630, but I just saw a Cyrix 6x86+ for $189, and a dual processor motherboard for $229. What does it mean to have dual processor capability, and would I be able to use two 6x86's in the ZIF sockets? The motherboard is a Tyan Tomcat II from MicroXperts (www.microx.com). Would I be able to run normal PC programs on this?

Andy Campbell

Tech Editor Chris Dunphy replies: *Dual CPU motherboards aren't really worth it unless you're running a network server or doing rendering. Be aware that Win95 doesn't recognize multiple processors; only NT or some Unix variants will be able to use it. Even under NT, most software isn't written to be multithreaded, so a single program stays tied to one CPU while the other goes idle. But if you are going to be doing 3D rendering, image processing, or serving files on the net, the more CPUs the better.*

Games people play

Are all Win95 games 32-bit games and if so, shouldn't they yield much faster frame rates on a P-Pro than a Pentium? Don't games use the floating point math processor more, so wouldn't they also tend to have faster frame rates on a P-Pro?

Derek Struye

Tech Editor Chris Dunphy replies: *Yes, they are 32 bit, and for the most part, DOS games have been primarily 32 bit for a while now. The 16-bit slowdown comes when you have to interface with the operating systems and devices through old 16-bit interfaces. So, with Win95 the P-Pro is an excellent platform for gaming, particularly for 3D games that make heavy use of the floating point processor.*

The reason the P-Pro hasn't really earned a rep as a game machine has less to do with the 16/32-bit issue than it does with optimization. To get the most speed out of an advanced CPU such as the P-Pro, the C-compilers order instructions to best flow through the CPU's internal pipeline. Because more gamers have Pentiums than P-Pros, the code order in games has been optimized for the Pentium. As the P-Pro becomes more prevalent, with a simple recompile, games will suddenly get a much more dramatic speed boost. Look for games to begin being optimized for the P-Pro soon.

Search party needed

I am lost with this new wave of sound and video technology. What are the real differences in the Vérité- and Voodoo-based boards? What makes these accelerators better than other video cards on the market? How much better is 128 bit than 64 bit? What makes the high-end professional boards so good, and would they make games better or just improve graphic drafting and artwork? What is the PnP on the Creative Labs and Ensoniq boards mean, and what does it do for sound?

Jonathan M Louie

Tech Editor Chris Dunphy replies: *Lots of questions... here are some quick answers:*

1. Vérité is a 2D/3D chip; the Voodoo is 3D only. Both of these chips excel at 3D acceleration.

2. The 128-bit graphics cards can read data from memory twice as fast as the 64-bit graphics cards. In theory, anyway. In practice, 128-bit cards have proven to be real workhorses, but 64-bit cards are still holding their own and aren't obsolete yet.

3. Professional boards are optimized for professional work and OpenGL; consumer boards are optimized for games and Direct3D. Board developers have only focused on optimizing one or the other driver set, but it won't be long before we start seeing drivers that go both ways equally well.

4. PnP stands for Plug and Pray, uh, I mean Play. It's the hardware protocol that allows boards to auto-configure when plugged into your machine. No more DIP switches or IRQ conflicts, in theory, anyway...

Send your 12-Step Clinic questions to the Doctor at: clinic@bootnet.com

boot
white paper

YOUR PERSONAL TECH **BRIEFING** ON THE **CONCEPTS** AND **COMPONENTS** THAT MAKE UP THE **PC** EXPERIENCE

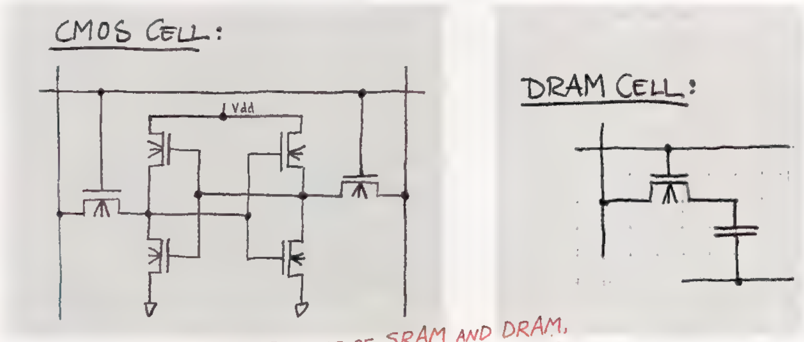
this month: *RAM Explained*

In the never-ending quest for top-notch performance, nothing affects your system more dramatically than RAM and how fast your computer accesses it. Bandwidth is primarily determined by your CPU **bus speed** and how wide your **data path** is. A Pentium has a 64-bit wide data bus, and the bus speed ranges from 50MHz to 66MHz, assuming it's not overclocked (see the 12-Step Program in *boot* 05). On account of its faster memory bus speed, a P133, with its 66MHz bus, typically performs on par with a P150 with a 60MHz bus. The Cyrix 6x86 P200+ pushes the bus speed envelope to 150MHz internally, with a 75MHz external bus speed. Still, more than just bus speed affects memory performance. The world is filled with a slew of different flavors of memory, and their idiosyncratic traits play a huge role in determining just how much giddyap your PC has.

— Chris Dunphy

Static Versus Dynamic

There are two ways to build a memory chip—either with a **static core** or with one needing continuous refresh. **Static memory (SRAM)** is built entirely out of transistors, and delivers the faster access times. **Dynamic memory (DRAM),** on the other hand, is built with a tiny capacitor paired with a transistor and is much simpler, smaller, and cheaper. Charged, the capacitor holds a '1' value. Reading and writing this charge electrically is much slower than checking the ON/OFF state of the transistors found in SRAM. DRAM must also be periodically refreshed to keep the charges from fading. So what we have is a trade-off: SRAM is fast, expensive, and uses a lot of power; DRAM is slower, a lot cheaper, uses less power, and can be made in much greater densities. To get the best of both worlds, most PCs come with an SRAM **cache** and a DRAM **main memory**.

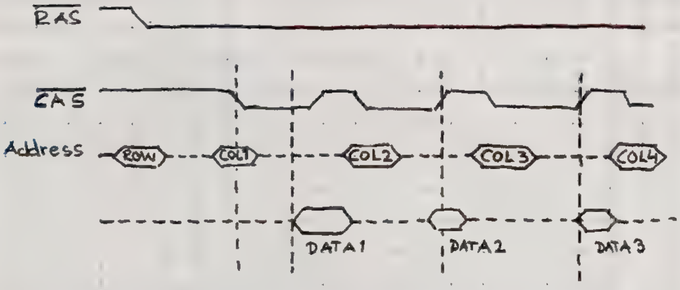


<DIAGRAM: ONE BIT OF SRAM AND DRAM, NOTE THE RELATIVE SIZE AND COMPLEXITY.>

Inside DRAM

To economize on **address pins** going to DRAM chips, the **memory controller** takes the **address** sought by the CPU and breaks it into a row address and a column address. A typical **memory access cycle** (pre-EDO fast page mode DRAM) looks like this:

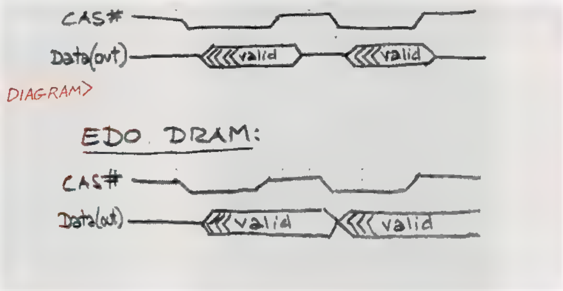
<FAST PAGE MODE TIMING DIAGRAM>



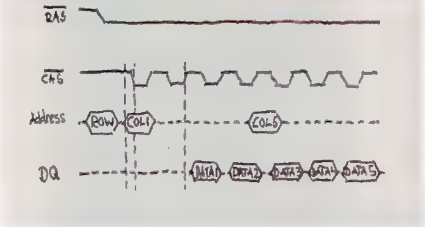
First the desired row address is put on the address bus, and the **row address strobe (RAS)** line is triggered, causing the memory chip to prepare to access that row. Then the column address is signaled, and the **column address strobe (CAS)** signals the memory. The memory chip then writes the data to the data lines, and signals the CPU to read them. **Fast Page Mode** allows multiple column accesses to be carried out within the same row, making subsequent accesses faster. This is called a **burst read**. The typical **timing** of these cycles is 5-3-3-3, which means that it takes five bus **clock cycles** for the first set of data, and then three for each of the next reads in the burst.

EDO

Extended Data Out (EDO) DRAM takes this efficiency a step further, including a **buffer** on the DRAM chip to allow the data pins to hold a valid value longer, even after CAS has cycled for the next memory read. Because the CPU has longer to pull data off the bus, data reads are more aggressively timed. Typically the speedup is only around 10 percent, but because EDO DRAM doesn't cost much more than regular DRAM, it is growing in popularity. Typical timing for an EDO DRAM read is 5-2-2-2.



<EDO vs REGULAR DIAGRAM>



<BEDO TIMING DIAGRAM>

BEDO-Burst EDO

To further optimize, **BEDO DRAM** chips assume that the column addresses being read are in series, and thus skip the step of writing out the column address for every burst read. This gets the timing down to 5-1-1-1. But few motherboards support this type of memory, since, for the most part, it is being passed up in favor of SDRAM.

SDRAM for the Future

Traditional DRAM works at its own speed, and when it's not fast enough to complete a transaction it inserts **wait states**, idling the CPU. The next step in DRAM's evolution is to tie its speed directly to the system clock on the memory bus. The timing diagram looks like burst EDO, and the timing is 5-1-1-1, but SDRAM has one key advantage: It can be clocked faster. Traditional EDO with a 60ns speed is only rated fast enough to handle a 66MHz bus, and overclocking to 75MHz or 83MHz can potentially cause problems. SDRAM, on the other hand, can be built to handle bus speeds of 100MHz or higher. Once economies of scale kick in, SDRAM should cost little more than its slower cousin.

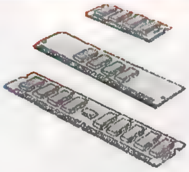
Other Flavors

As if all this weren't enough, there are even more varieties of RAM optimized for graphics cards. **VRAM** and **WRAM** are **dual-ported** memories that allow the CPU to draw into memory at the same time that the **RAMDAC** is reading the memory to draw the screen. At high resolutions, refresh rates, and color depths the performance advantage is invaluable. **MDRAM** is a variant used by Tseng ET-6000 chips that makes memory access **parallel** internally, speeding up reads and writes to scattered memory addresses. **SGRAM** is a special graphics-optimized version of SDRAM that includes the ability to do **masked writes**—for faster modifications of solo bits within a memory address—and **block** writes, which speed up drawing solid screen areas.

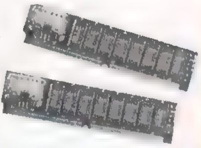
Exotica

Another interesting type of memory emerging is **Rambus RDRAM**. Rambus memory narrows the data channel width down to 8 bits, and then runs at blazing channel speeds of up to 600MHz. Board design is significantly simplified by the presence of fewer pins between chips. RDRAM has shown up on a few graphics cards, as the memory in the Nintendo64, and as the main memory for some SGI workstations. Given that this new memory requires an entire motherboard architecture be built around its peculiarities, it remains to be seen whether RDRAM will ever move into the mainstream to replace EDO or SDRAM as the system memory on PCs.

SIMMs, DIMMs, and Pin Counts



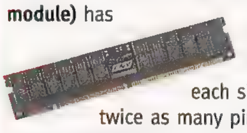
Almost as confusing as the array of RAM technologies are all the different ways to plug memory into your machine. In the old days, you literally dropped chips into empty sockets on your motherboard. Bent pins and blown chips were the order of the day, so there was much rejoicing when **SIMMs (single inline memory module)** appeared on the scene.

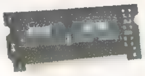


SIMMS are small circuit boards with a mounted bank of memory chips, designed to be easily drop-clicked into slots on the motherboard. Initially they came in **30-pin** flavors that supported only eight data bits per SIMM. With 486's accessing memory 32 bits at a time, it took banks of four identical SIMMs to expand the memory.

Next came **72-pin** SIMMs—the most common type today. Their 32 data pins work with the 64-bit reads of the Pentium, and they must be added in matched pairs.

The edge connector of a SIMM has the same electrical contact on both sides. In contrast, a **DIMM (dual inline memory module)** has different contacts on each side, allowing twice as many pins in the same space. **SODIMM** is a type of DIMM optimized for notebooks. Think of it as a 72-pin SIMM folded in half. For desktop machines, the form factor of choice for SDRAM systems has been **168-pin** DIMMS that support 64 data bits at a time—perfect for pairing with the Pentium's data bus. No more need for pairs.





***Note:** Make sure the metal used on the edge connector of your SIMM/DIMM matches that in the socket, or else gradual corrosion can occur, eventually making your memory flaky. Match gold with gold, and tin (silver looking) with tin.*

boot worthy

EACH MONTH, **BOOT** EDITORS GATHER THE BEST **PRODUCTS** IN A SPECIFIC CATEGORY AND DEEM THEM: BOOT**WORTHY**

this month: *PDAs*

In Neil Stephenson's novel *The Diamond Age*, engineers have developed the technology to build computers and other machines so small they can be injected into the bloodstream. Today's Personal Digital Assistants are a step toward that level of micro-miniaturization. These pocket powerhouses—none of them weigh more than a pound—can do just about anything a notebook or desktop computer can do. And even the most expensive of them costs a fraction of a low-end notebook.

The elegance of these devices extends beyond their diminutive physical characteristics. Their operating systems and application software are equally tiny. Take the Pilot: Its entire OS consumes just 35K of the machine's memory. Tricked out with the right accessories, you could write a book, e-mail it to your agent, then surf the web to check out the critic's reviews. Play a few games while you're waiting for the checks to start rolling in, then use a personal finance manager to figure out how you're going to spend your riches.

Psion Series 3c

PRICE: $599
CPU: NEC V30H, 16-bit/7.68MHz
MEMORY: 2MB
SCREEN: 480x160
COMPANY: Psion
PHONE: 800.997.7466
URL: www.psion.com

Psion is one of the pioneers of handheld computing, and their experience is showcased in the Series 3c. This device shines in every way, from its ergonomic design to its light weight to its highly legible, backlit display.

Choosing a veteran in the field offers other advantages, too. Psion has amassed a large pool of third-party developers. These partners offer everything from standard contact managers (e.g., Symantec's *ACT!*) to mapping software (Microsoft's *AutoMap*). There's a ton of shareware and freeware products available, too, which can be downloaded from the Internet. Lee McLoughlin maintains an extensive archive of Psion software. Check out his web site at **src.doc.ic.ac.uk/packages/psion/icdoc/**

All this is in addition to the collection of application software that comes pre-installed on the Series 3c. The device's calendar, word processor, spreadsheet, and database can be launched from a touchpad button bar. One of the Psion's few drawbacks is that its screen is not touch sensitive; everything must be handled from the keyboard.

But if you can't find a product that suits your needs, you can always develop your own. Psion offers a rich development environment that includes Psion's OPL built-in programming language, run time support for OVAL (Psion's Visual Basic-compatible programming language), and C- and object-oriented C-compilers.

The Series 3c is powered by an embedded NEC V30H (a 16-bit CISC processor equivalent to an Intel 80186) running at 7.68MHz. Its Psion EPOC/16 pre-emptive, multitasking operating system, application software,

SERIES 3c
Delete
Enter
Help

and your data is stored in 2MB of RAM, which can be expanded with the use of one or two of Psion's proprietary flash-memory drives (8MB each). These plug into tiny bays beneath the keyboard.

Psion addressed communications needs by building both an IrDA-compatible infrared transceiver (capable of 115.2Kbps) and an RS232 serial port (capable of 57.6Kbps) into the Series 3c. Communications options include Psion's own Travel Modem (a fax/modem capable of 14.4Kbps) and a PC card adapter that allows you to use any Type II PC card modem with the Series 3c.

Using *PsiWin*, Psion's optional PC connectivity package, you can create, open, and work on any Windows files on the Series 3c, and back up the Psion's data to any PC disk drive. The package also synchronizes the built-in calendar program with whatever PIM you run on your desktop machine. Recently, Psion announced new partnerships that will bring Internet access, web browsing, and two-way paging service to the Series 3c.

The Psion's tiny footprint, ease of use, robust OS and application-development environment, and deep software well add up to a compelling handheld computer solution.

Sharp Zaurus ZR-5800FX

PRICE: $679
CPU: 16-bit proprietary
MEMORY: 2MB
SCREEN: 320x240
COMPANY: Sharp
PHONE: 800.237.4277
URL: www.sharp-usa.com

Sharp is one the biggest players in the PDA market, and the Zaurus ZR-5800FX is one reason why. The ZR-5800FX combines one of the Psion's best features—the ability to [illegible] [illegible] [illegible] multi-position screen—with the typewriter-style keyboard found on the other PDAs we looked at.

The touch-sensitive screen can be used for drawing maps, diagrams, schematics, and such. These drawings are best accompanied with pen [illegible], not [illegible]. The Sharp also recognizes pen signs [illegible] [illegible] [illegible] [illegible] on each side that when tapped, launch one of the device's built-in applications.

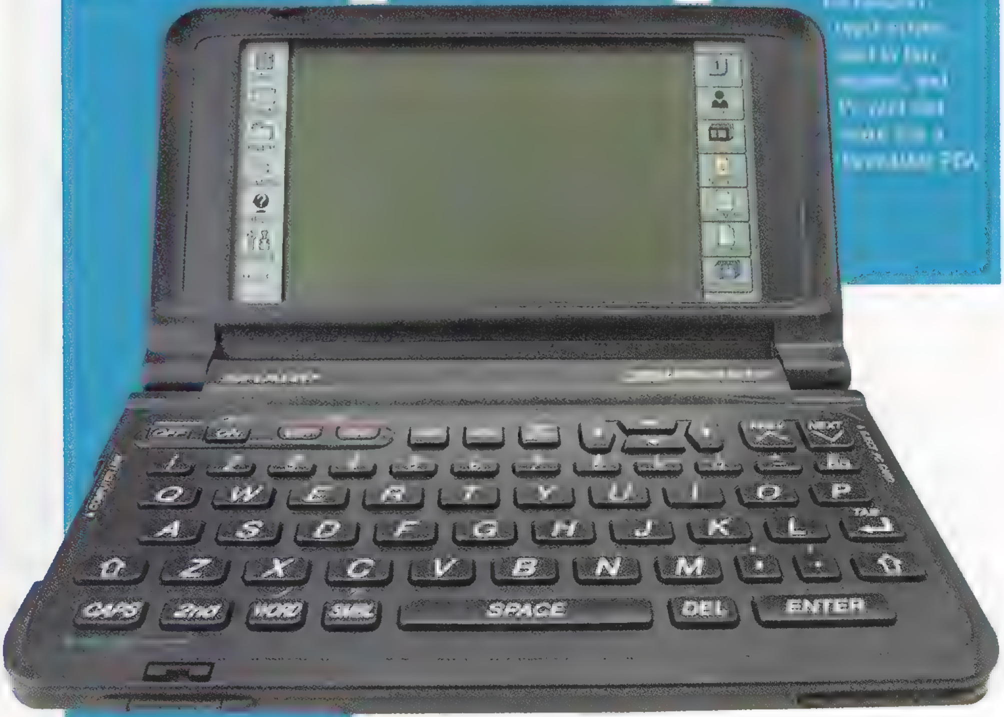
There's no docking cradle, but there is an infrared port capable of 115.2Kbps data transfer rates and a 9-pin serial port. If you need to synchronize your Zaurus to your PC, you'll want Sharp's optional Application Partner for Windows. This $119 package includes Windows software and an infrared transceiver for your PC and makes moving files between the two devices a drag-and-drop operation. It will also automatically synchronize the Zaurus' built-in contact manager with popular software such as ACT! and Schedule+.

Although the Zaurus line has been around longer than any of these other PDAs, its pool of [illegible] [illegible] [illegible] [illegible]. Michael S. Mahony maintains an archive of Zaurus apps on his web site at www.pdasolutions.com/[illegible].

The ZR-5800FX is equipped with 2MB of RAM, but the device's Synergy operating system and all its built-in applications consume less than 400K, leaving about 1.6MB available for your data. Built-in applications include a word processor, contact manager, activity manager, spreadsheet, and even an outline processor.

If you're looking for a device that can be expanded, the ZR-5800FX features a Type II PC card slot that can accommodate a variety of expansion devices, including flash memory cards up to 16MB. You won't need to plug a fax/modem into that slot, however, because the Zaurus model comes with its own incredibly tiny [illegible] fax/modem. [illegible] [illegible] available [illegible] [illegible] include [illegible] [illegible].

We [illegible] [illegible] at the [illegible] ZR-5800FX, with its full-function [illegible] input system [illegible] [illegible], and [illegible] will [illegible] [illegible] a handheld PDA.



PC card peripherals, such as Socket's *PageCard*, work with PDAs running Windows CE.

Windows CE

Windows in the palm of your hand

For many people, the biggest barrier to adopting a new tool—or toy—is the learning curve required to master it. Well, if you know Win95 or NT, then you have all the skills to be instantly productive with Windows CE.

Win CE looks a lot like Win95, but it functions more like NT: It's both multitasking and multithreaded. Every CE product comes with pocket versions of *Word* and *Excel*, plus a host of other mini-apps.

The greatest drawback to CE is its resource requirements. Compare the 8+4 megabytes of memory in the Philips Velo 1 to the 2MB total memory in the Psion Series 3c.

The greatest benefit to CE is that there's virtually no learning curve. Having a known quantity for an OS should also make it easier for developers to create new applications. The fact that no fewer than seven manufacturers have already announced and/or shipped handheld computers that run CE won't hurt either.

The Socket PageCard is a good example of this synergy. The same day that CE-based handhelds shipped, Socket announced that its PC Card pager would be compatible with those equipped with a PC Card slot. Using the bundled *PageSoft*, you can receive pages and wireless e-mail right on your handheld PC.

For more information about Windows CE, check out Microsoft's web site at **www.microsoft.com/windowsce/pie/**. For more information about the Socket *PageCard*, call 800.552.3300 or check out their web site at **www.socketcom.com**.

— *M.B.*

Philips Velo 1

PRICE: $599 to $739
CPU: MIPS R3900, 32-bit/36.6MHz
MEMORY: 2MB to 4MB RAM; 8MB ROM
SCREEN: 480x240
COMPANY: Philips Electronics
PHONE: 212.850.7350
URL: www.velo1.com/

When seven manufacturers set out to design handheld computers that all use the same operating system (Windows CE, see sidebar), their biggest challenge must have been how to differentiate one from the other. From what we've seen of the Velo 1, Philips has won that contest hands down.

The Velo 1's most unique feature is its capacity for voice recording. If you're driving and a great idea pops into your head, grab the Velo 1, punch a button on the case (no need to crack it open), and record your thoughts. The Velo 1's standard feature set also includes a built-in, low-power, 19.2Kbps fax/modem and a PC docking cradle—features that are optional on most other handhelds.

The Velo 1 is powered by a MIPS R3900 32-bit embedded RISC processor running at 36.6MHz. Its OS and application software are stored in 8MB of Fast Page Mode ROM, and it offers either 2MB or 4MB of EDO DRAM (expandable to either 34MB or 36MB of RAM!).

The Velo 1 offers plenty of options for the expansion minded: two Miniature Card slots (a diminutive Intel design that features similar functionality to PC cards, but in a form factor that's half the size), plus Philips' proprietary Velo CT connector. One of the first products that will be available for the latter port is a Type II PC card slot module.

Considering most of us will use a PDA in conjunction with a desktop computer, the inclusion of a docking cradle is a great idea. When you come in from the road, drop the Velo 1 into the docking station and it automatically synchronizes the content of both machines. It charges the unit's batteries, too.

The RJ-11 jack for the fax/modem is an inspired design that's so thin, Philips placed it on the lid housing the Velo 1's screen. The hinged panel pops up to form the block required for the phone cable.

Philips has assembled a massive software bundle that includes Microsoft's standard CE apps, plus *Pocket Quicken*, *Mobile Forms Database*, *cc:Mail*, and more. Most of these apps are available with the touch of a single button on the Velo 1's keyboard.

The Velo 1's integrated communications and its voice-memo feature make this device a standout product in what has suddenly become a crowded field.

U.S. Robotics Pilot 5000

PRICE: $299
CPU: Motorola MC68328, 16-bit/16MHz
MEMORY: 512K RAM, 512K ROM
SCREEN: 160x160
COMPANY: U.S. Robotics
PHONE: 800.949.6757
URL: www.usr.com

[illegible]

[illegible]

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pilot
CALCULATOR

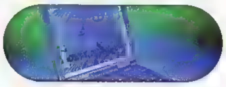
bootWorthy PDAs

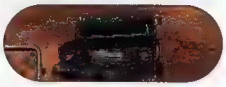
MANUFACTURER	MODEL	PRICE	CPU	MEMORY	OPERATING SYSTEM	DISPLAY RESOLUTION	BACKLIT DISPLAY	TOUCHSCREEN	DOCKING CRADLE	MODEM	INFRARED	DIMENSIONS (INCHES)	WEIGHT (OUNCES)
Psion	Series 3c	$599	2NEC V30H 16-bit/7.68MHz	2MB	EPOC/16	480x160	on demand	NO	Optional	Optional	YES	6.5x3.35x0.87	9.7
Sharp	Zaurus 5800FX	$679	16-bit proprietary	2MB	Synergy	320x240	on demand	YES	optional sync cable	fax/modem standard	YES	6.7x3.9x1	14.7
Philips	Velo 1	$599 to $739	MIPS R3900 32-bit/36.6MHz	2MB to 4MB RAM; 8MB ROM	Windows CE	480x240	on demand	YES	standard	fax/modem standard	YES	6.8x3.7x1	14.3
U.S. Robotics	Pilot 5000	$299	Motorola MC68328 16-bit/16MHz	1 MB	Palm OS	160x160	NO	YES	standard	planned	NONE	4.7x3.2x0.7	5.7

boot

previews

HARDWARE
ON THE HORIZON AND
SOFTWARE SOON TO SHIP





68 Gateway **Solo 2200**

70 Page**Master** LCD

70 Test Drive: **Off-Road**

71 **Rebel**lion

72 **Audio** Preview
SonicVibes, Song**Bird**, Freedom **5600**, MAXI**Sound** Home Theater, Sound **Blaster AWE64** and AWE64 **Gold**, Audiotrix **3D-XG**

THE BOOT TRACKING SHEET

TITLE	DEVELOPER	DATE
Comanche 3	NovaLogic	3/97
X-Car Experimental Racing	Bethesda Softworks	3/97
Dungeon Keeper	Bullfrog	3/97
Theme Hospital	Bullfrog	3/97
Red Baron II	Dynamix	3/97
Armored Fist 2	NovaLogic	4/97
Sierra Pro Pilot	Sierra On-Line	4/97
Jedi Knight: Dark Forces 2	LucasArts	4/97
Hexen 2	Raven/id	5/97
Creation	Bullfrog	5/97
Fear	Dynamix	5/97
Blood	3DRealms	6/97
The Curse of Monkey Island	LucasArts	6/97
Shadow Warrior	3DRealms	6/97
Flight Unlimited II	LookingGlass Technologies	6/97
Quake/Win95	id	6/97
Grand Prix Legends	Papyrus	6/97
Ultima IX	Origin	12/97
10th Planet	Bethesda Softworks	12/97
Prey	3DRealms	12/97
Mask Of Eternity	Sierra On-Line	12/97

* These dates are subject to change

H/W

EXCLUSIVE! THE 1ST HANDS-ON PREVIEW OF AN MMX NOTEBOOK!

Gateway 2000 will be among the first manufacturers to offer an MMX-powered notebook.

Gateway Solo 2200

On the road with MMX

They say it gets so cold in South Dakota during the winter that dairy farmers get milkshakes straight from their cows. When the cowpunchers at Gateway 2000 promised to build us an exclusive prototype of their brand-spanking-new MMX-powered notebook, but missed the air-express company's deadline to get us a machine before our deadline, it didn't take much cajoling to get one of their product managers to hand-deliver the box. After all, it was 10 degrees there, and 75 degrees at our offices in balmy Brisbane, California.

Based on our hands-on look at a prototype, there's nothing spectacularly different about the Solo 2200—other than the fact that there's an MMX processor breathing under the hood. If you're itchin' to play MMX-enhanced *Pod* at 30,000 feet, this will be one of the first notebooks to deliver the action. In fact, we ran a beta copy of *Pod* on the 2200 and it looked fabulous: with beautiful texture maps and frame rates that had our eyes buggin'. We also coerced the folks at Epic MegaGames, who just happened to be visiting when the 2200 was delivered, into loading an early copy of the MMX version of *Unreal* onto the machine. The game won't be shipping until June, but we were stunned by what we saw.

The power supply is small and light. Leaving it out of the case eliminated the need for a cooling fan.

MMX will reportedly deliver a 20 percent boost in overall performance. Our preliminary benchmark numbers—remember, this is not a shipping product—were damn impressive, registering significant gains over the Solo 2100 even with its video set to 24 bits per pixel. Many other components have also changed, so it's difficult to tell which changes are most responsible for the improvement.

The 166MHz MMX-enabled Intel P55C processor at the heart of this mobile monster is the first to be manufactured using Intel's new 0.35 micron CMOS process technology. The 57 new instructions in the MMX set accelerate only those applications and games written to take advantage of it, but all software will benefit from the chip's increased onboard cache; which Intel has doubled to 32K (16K for instructions, 16K for data).

Physically, the Solo 2200 is indistinguishable from the older Solo 2100—with the exception of the new RCA jack provided for NTSC video output. Plug this into a video monitor and you have a great portable presentation system; plug it into a big-screen TV and you have an awesome game machine. And when external DVD-ROM drives become a reality, you can pair it up with CompCore Multimedia's *SoftDVD* for laser-disc-quality movies.

Our preliminary benchmark numbers were damn impressive, registering significant gains over the Solo 2100.

The prototype we examined was equipped with Intel's 8243MX, PCI bus core logic, and Gateway is augmenting the MMX Pentium with 256K of pipeline burst secondary cache. We're accustomed to reviewing Solos with oodles of EDO DRAM, but this unit came with just 16MB. There are two open SIMM slots, and with Gateway's build-to-order policy, you can get the 2200 with as much as 80MB installed at the time of purchase.

Gateway is adding some serious video muscle to the 2200, which will be a welcome change from the wimpy graphics on the 2100 model. The Chips & Technologies 65554 64-bit graphics engine will be supported by 2MB of EDO DRAM, so the machine will be capable of 24-bit graphics at 800x600. On an external monitor, the chipset is capable of 1024x768 with 65k colors and even 1280x1024 with 256 colors, but these resolutions can't be displayed on the 12.1-inch LCD. One of the machine's PCMCIA slots will be connected to its Zoomed Video Port for fast video performance.

The Solo 2200 still requires the swapping of its floppy and CD-ROM drives.

Sound is also being improved, thanks to the inclusion of an ESS ES1878 chipset for Sound Blaster compatibility, plus an ESS ES690 synth for wavetable audio. Gateway is even building an ESS ES938 chip for 3D stereo surround sound. Unfortunately, the stereo speakers are still on the deck (on either side of the track pad), where all that wonderful audio will end up being muffled by your wrists.

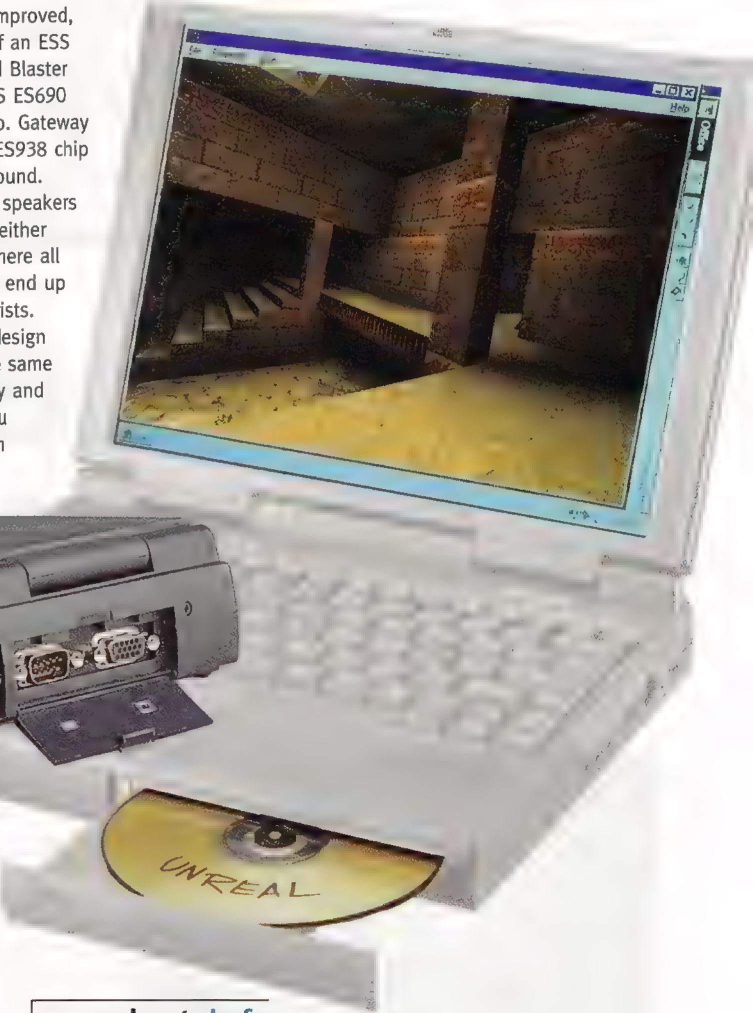
The 2200's modular design requires that you use the same bay for its 3.5-inch floppy and 8x CD-ROM drives, so you won't be able to use both devices simultaneously. On the bright side, you will be able to plug batteries—either lithium ion or NiMH—into both bays (and warm swap the one in the battery bay without rebooting). Gateway will also provide a cable that enables you to use the floppy drive externally.

If you're looking for a desktop replacement system, a full complement of ports reside on the back of the machine, including a docking station. There's also a high-speed, IrDA-compliant infrared port (awkwardly mounted on the side of the unit, next to the audio I/O jacks).

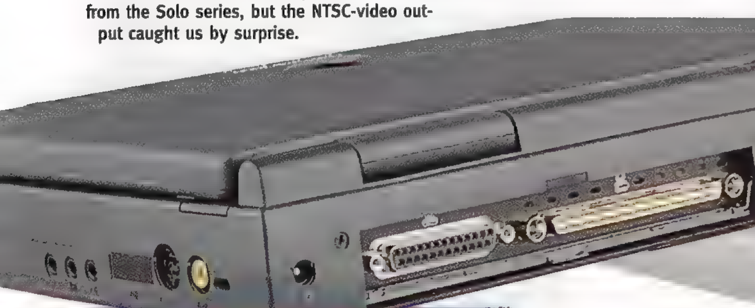
For all its improvements, the 2200 will still possess a few characteristics that we just don't approve of: there are no feet for adjusting the keyboard height, for example, and you'll have to adjust the volume using keyboard combinations.

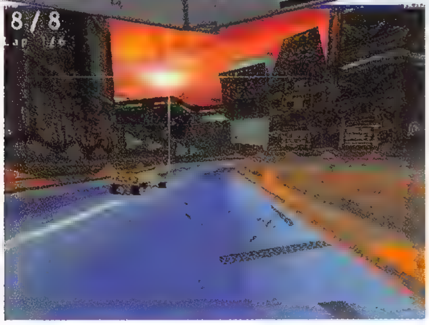
But once you've had a taste of MMX, it's tough to go back.

— *Michael Brown*



The 2200 has all the I/O ports we've come to expect from the Solo series, but the NTSC-video output caught us by surprise.





The MMX version of *Pod* looks stunning on the Solo 2200's 12-inch screen.

product info

AVAILABLE: feb 97
PRICE: TBA
COMPANY: Gateway 2000
PHONE: 888.888.0243
URL: www.gw2k.com

H/W

PageMaster LCD

A thin twister

LCD screens weigh less, have zero EM emissions, are more energy efficient, take up much less space, and, once built in volume, will be much less expensive to manufacture than tricky glass tubes. The day we see our last new picture tube is still a few years off, but the pivoting Portrait PageMaster LCD will be among the first affordably priced steps in that direction.

In portrait mode, the 15-inch monitor will pack enough real estate to view a standard-size page without zooming or scrolling. Since the LCD has no tube to mask, image area will extend to the edge of the 12-inch by 9-inch screen, delivering the viewable area of many 17-inch displays. The PageMaster will be powered by a Sharp dual super-twisted nematic LCD screen with a "Superbrite" backlight, and will hold image and contrast at a wide variety of viewing angles. A custom PCI-based graphics card provides the interface to drive the PageMaster at up to 1024x768 with 16-bit color. Graphic drivers for both orientations will be provided for Windows 3.1, 95, and NT 4.0, as well as for Macintosh System 7.5.

For those tired of scrolling through tall pages on their space-hoggin', radiation-emittin', energy-chewin' old-fashioned screen, this new look will prove useful and cool. And it looks hip, too. As if that weren't enough, there's a cool pencil tray in the base.

— *Chris Dunphy*

The PageMaster LCD has everything you could want in a new screen: it uses less power, weighs only 10 pounds, takes up less desk space, has the screen area of a 17-inch traditional CRT, *and* it pivots.

product info

AVAILABLE: early 97
PRICE: less than $1,500
COMPANY: Portrait Displays
PHONE: 800.858.7744
URL: www.portrait.com

S/W

Test Drive: Off-Road

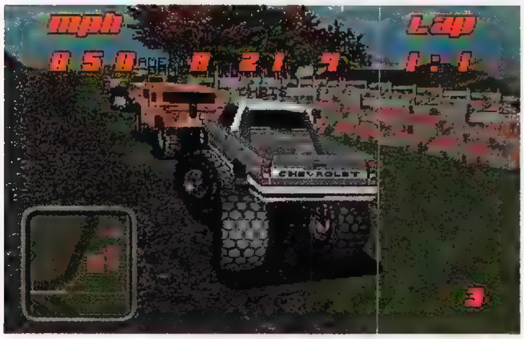
Take 'em for a spin...

Continuing the *Test Drive* tradition of simulating vehicles you can only dream of actually owning one day, *Test Drive: Off-Road* will put you behind the wheel of either a Hummer, Jeep Wrangler, Land Rover Defender 90, or Chevrolet K-1500 Z71 truck. The paved highway has given way to dirt, mud, sand, and snow—and best of all, you'll be able to race against your friends to determine who is king of the off-road.

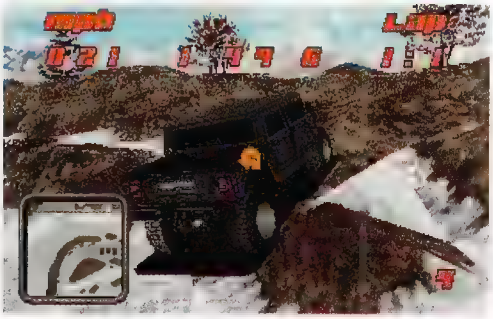
The game environment will be totally nonlinear. Find a shortcut; take it. If you just want to ignore the track and seek hang time in the hills, you'll be able to do that too; or just churn mud, trying to beat the clock to the finish. To keep things interesting, the game will have hidden vehicles such as an off-road Beetle, monster truck, dune buggy, stock car, and hot rod. Setting the pace will be a driving soundtrack from the alternative band Gravity Kills.

The game will support up to four players with split screen, modem, or LAN play. For even more players and challenge, you can set up a tournament. *Test Drive: Off-Road* will run under either DOS or Win95, and support up to SVGA 640x480 resolution.

— *Chris Dunphy*



Race across snow, sand, or dirt—and don't be afraid to get off the beaten path in *Test Drive: Off-Road.*



***Test Drive: Off-Road* begins where the road ends.**

product info

AVAILABLE: feb 97
PRICE: $49.95
COMPANY: Accolade
PHONE: 800.245.7744
URL: www.accolade.com

S/W

Rebellion

Conquer a galaxy far, far away...

Drawing from the Star Wars *trilogy, Dark Horse's comics, and Timothy Zahn's novels,* Rebellion *will be set in the blackness that is outer space and deliver a real-time tactical combat sim interwoven with a vast galaxy management simulation. Take up arms as part of the Rebel Alliance, eager to strike back at Emperor Palpatine and his ever growing legion, or join the ranks of the Galactic Empire, ready to crush the Rebel scum into utter oblivion.*

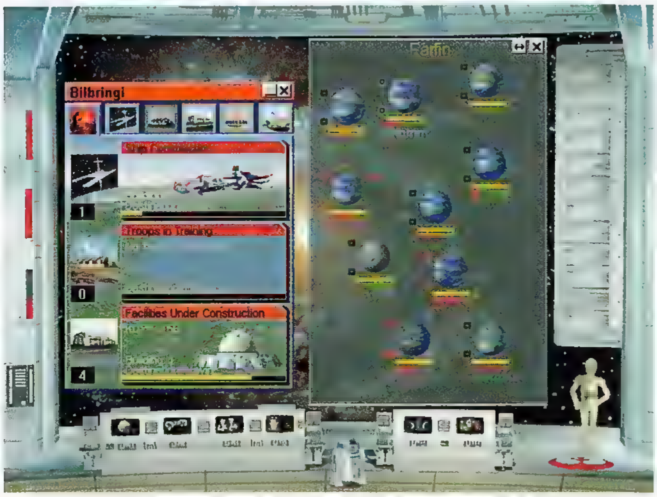
We talked to LucasArts' Tom Sarris *about the upcoming space combat opera.*

boot: How does *Rebellion* differ from all the other *Command & Conquer* clones?

Sarris: *Rebellion* will not be a land-based strategy game. Closer comparisons could be made to *Ascendancy*, *MOO2*, etc. And compared to those galactic-domination games, the *Star Wars* universe provides a natural difference. From a purely game design perspective, *Rebellion* is unique in that it is character driven, has a real-time 3D tactical battle engine for combat resolution, and the strategic game operates in a real-time environment.

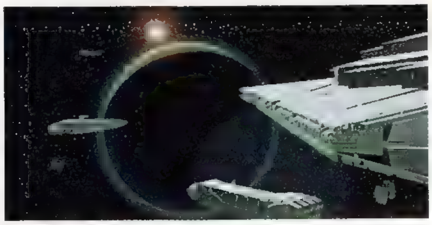
boot: What technology will separate *Rebellion* from those other titles?

Sarris: *Rebellion* will incorporate most of DirectX, including Direct3D, DirectPlay, DirectDraw, and DirectSound. Head-to-head game performance via LAN or modem will be enhanced by proprietary CoolCommunications. Rather than a single machine arbitrating game resolution, CoolCommunications will give control to the machine playing that side (Rebel Alliance or Galactic Empire) and allow faster gameplay with less encumbering the communications pipeline.



You can control your force's every move with a little help from your friendly protocol droid in *Rebellion*.

Rebellion's tactical game will utilize Direct3D, and will be the first 3D game (to our knowledge) in which a player's battle assets are dependent entirely upon the strategic gameplay. Because of this, we can't predict the assets in a given battle; nor would we want to. We want the player to determine that through their own actions. The goal for *Rebellion*'s tactical game engine is speed, speed, speed... and to support all the varied spacecraft from the *Star Wars* universe that may take part in battle. To achieve this, *Rebellion*'s tactical game will support 256 colors and utilize 3D acceleration by cards supporting the Direct3D API.



Stunning *3D StudioMax*-rendered cinematics heighten *Rebellion*'s visual presentation.

boot: Why not include ground attacks in the tactical battles? Was that a conscious decision to distinguish *Rebellion* from other real-time strategy games?

Sarris: The critical "levers of control" in a *Star Wars* universe are 1) planetary loyalty, 2) planetary production, 3) fleets, and 4) special ops forces/forcewielding characters. Gameplay will focus around these levers. At *Rebellion*'s level of conflict, ground troops will allow a player to control planetary systems, even if the loyalty of the planet's population has shifted to the other side. Ground troops merely "hold the dirt" until a larger force with greater power is amassed by your opponent. We, of course, think that ground combat games set in the *Star Wars* universe would be compelling, but could best be done as a separate product.

boot: Will you be able to create your own battle maneuvers in the tactical combat sequences?

Sarris: *Rebellion*'s tactical game is not in a set-piece battle with a known number of assets, like football. Rather, each battle will engage different numbers and different types of friendly and enemy ships. Battles are fluid and operate in real time. Prearranged or canned "maneuvers" yield poor results in this environment. The fluid and 3D nature of the battles will require the commander to take direct control of ships. But taking command will not require constantly clicking upon ships to have them move here and attack there. Ships are arranged into task forces, which may be restructured at will by the player. Task forces and fighter groups may be selected by mouse clicks or keyboard strokes. *Rebellion* will allow for sophisticated commands on the fly. For example, you'll be able to order a ship to move to this point, then that point, attack a target, then attack another target, and so on. The force will carry out this command to its conclusion, its destruction, or until different orders are assigned.

Rebellion will also introduce the concept of "missions." Missions will allow players to offload control of specific task forces or fighter groups to the computer.

The upper hand in *Rebellion* will go to the commander that best concentrates firepower upon enemy capital ships while avoiding the same. And we're confident that the controls to achieve this in a real-time, fluid, 3D environment are in *Rebellion*.

— Andrew Sanchez

product info

AVAILABLE: spring '97
PRICE: TBA
COMPANY: LucasArts
PHONE: 800.985.8227
URL: www.lucasarts.com

That's what friends are for

These characters are wont to run amuck in your Rebellion

The Rebel Alliance can always count on Luke Skywalker, Han Solo, and Chewbacca to help fuel the fires of *Rebellion*, while those close to the Dark Side can rely on Emperor Palpatine, Darth Vader, and Grand Admiral Thrawn to crush those accursed Rebels.

And the characters play a big part in *Rebellion*. If Luke is part of a mission that will take him near Darth Vader, the Dark Lord of Sith may sense his son and the mission may be compromised. Also, if Princess Leia gets captured, Luke and Han may reject your orders because they'll be off rescuing Leia.

Strangely, the developers have decided that some of the main characters, such as Luke Skywalker, *can't* be killed. *Why?* He may be a Jedi Knight-in-training... but he's not immortal!

— AS

H/W

www.bootnet.com

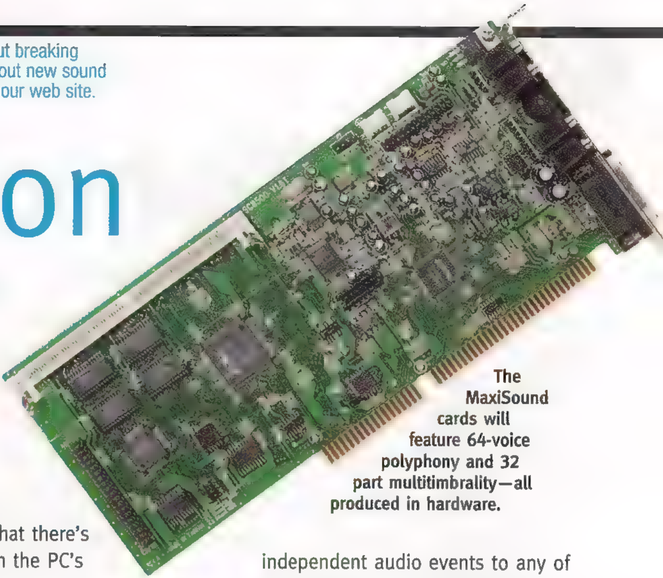
See it on bootNet

Check out breaking news about new sound cards at our web site.

Sound Evolution

Sound technology making the leap forward

Computer video has undergone a massive transformation during the last year, but PC audio technology has remained disappointingly stagnant. It's been 10 years since Adlib, pioneers of PC-based FM synthesis, introduced the first sound card, and the advancements since have only been minor. But all that is about to change.



The MaxiSound cards will feature 64-voice polyphony and 32 part multitimbrality—all produced in hardware.

I Spy With My Little Eye: PCI!

Everyone knows PCI is a better bus than ISA. PCI is capable of data transfer rates of 100MB/sec; ISA is capable of just 2MB/sec. PCI uses system resources more efficiently than ISA: one percent of the CPU's cycles compared to nearly 30 percent for ISA. Why then, are sound cards still ISA-based? The issue is Sound Blaster compatibility. It's simple: Software looks for a sound card with a DMA channel on the ISA bus (including sound chips installed on the motherboard). So, cards on the PCI bus must trick software into believing they reside on the ISA bus.

Creative Labs' Micah Stroud says, "You need to have true DMA in order to have Sound Blaster compatibility."

But **Distributed DMA**, a feature built into newer core-logic chipsets, supposedly *can* pull off this trick. Basically, DDMA snoops for activity from the 8237 Interrupt controller, and handles the software's requests. This way, PCI-based audio solutions can theoretically achieve 100 percent Sound Blaster compatibility.

Chip designer S3 recently announced **Sonic Vibes**, their new PCI-based chip. According to S3's David Taylor "the Sonic Vibes solution is 100 percent compatible with Sound Blaster applications running in DOS. The finesse (of DDMA) that has been applied to crack this engineering problem," says Taylor, "is a collaboration between the vendor of core logic, and S3. It's documented, it's running and—no doubt about it—it's a major breakthrough."

Surround-Sound Solutions

The companies promising the miracle of 3D sound using just two speakers could fill a phone book. Problem is, they've all sounded like crap—adding unacceptable noise and/or coloration. Now, Harman International (whose brand names include Harman-Kardan, JBL, and Infinity) is stepping up. And Spatializer, VLSI Technology, and Diamond Multimedia are piping in, too.

Harman's new audio signal processing algorithm, dubbed **VMAx (Virtual Multi-Axis Sound)**, promises to outperform Dolby AC3. In fact, Harman's demo at Fall Comdex consisted of a listening test pitting its process played through two speakers and a subwoofer against Dolby AC3 played through four speakers and a subwoofer.

Unlike Dolby AC3, VMAx is not an encoding/decoding process. The soundtrack does not have to be recorded using any special techniques in order to benefit from VMAx processing on playback. VMAx *does* require that there's a DSP on the PC's sound card or in the signal path.

Designed primarily as a Win95 solution, the Freedom 5600 isn't meant to replace your current FM-based card, but will be compatible with DOS-based games through a special emulation model running in a DOS shell.

VLSI Technology's **ActiSound 3D** technology will achieve the illusion of surround sound by using psycho-acoustic techniques. ActiSound will operate on FM, wavetable, and PCM audio streams and VLSI claims it can actually "place" audio events in a 3D space.

Spatializer claims its **N-2-2 Digital Virtual Surround Technology** will produce realistic multichannel audio and emulate Dolby AC3 audio from just two speakers by decoding AC3's five channels of information, and mixing them down into two. Simultaneously, the N-2-2 algorithm will process the signal to produce the illusion of additional speakers. The key difference between this approach and those of Harman and VLSI is that Spatializer will require the original audio to be Dolby AC3 encoded.

Diamond Multimedia's contribution will be the **Freedom 5600**. The card will reside in a PCI slot and require Win95, but its wavetable audio will be generated by Invision's excellent **Cybersynth software synthesizer**. Audio samples will be stored in system memory. And Diamond has plans for a 32-voice wavetable daughterboard.

With support for DirectSound and DirectSound3D for quadraphonic audio, a game running on the Freedom 5600 will be able to direct independent audio events to any of four speakers for true surround sound. The card's **Audio Devices 2181 DSP** will be capable of 40 MIPS; enough to support up to 24 independent streams of digital audio, without putting any load on the CPU.

Try it out! demo on the bootDisc

Listen to the WAV file on the CD simulating the ActiSound 3D technology.

Pick a Card, Any Card

Creative Labs is touting their new Sound Blaster cards—the **AWE64** and **AWE64 Gold**—as major improvements over the already-robust AWE32. The 64-voice polyphony *and* 64-part multitimbrality specs look impressive, but only 32 of those voices will be produced by the card's **EMU8000 wavetable synth** (the same chip used in the AWE32); the other 32 voices will be produced by a software wavetable synth.

Still, these ISA cards will boast other, more delectable features, including: 3D-positional audio; real-time digital audio effects; the ability to modify patches and change patch banks on the fly; and full-duplexing for simultaneous recording and playback of 16-bit audio—a feature the AWE32 sorely lacked.

The AWE64 is intended for home users; the AWE64 Gold is more ambitious. With its S/PDIF jacks, you'll be able to bypass the card's 20-bit DAC, taking digital audio straight from the card and routing it to and from digital pro-audio gear or high-end ADCs and DACs. To reduce noise, the Gold card won't have an onboard amplifier or IDE controller—features audiophiles don't use anyway.

Ubi Soft's ISA-based **MAXISound Home Theater 64** and **MAXISound Home Studio 64** sound cards will also feature a 64-voice synth, but with only 32-part multitimbrality. Unlike the AWE64, however, all 64 voices will be produced in hardware. Ubi Soft is also working on a daughterboard that will provide an additional 32 voices.

The cards will be equipped with two pairs of audio-out jacks for quadraphonic surround sound, and Ubi Soft is programming its new MMX game, *Pod*, to take advantage of this. The cards will be equipped with 4MB of sounds in ROM, and there will be a pair of 72-pin SIMM slots for adding sample memory.

The Home Studio model is being designed for musicians and will feature direct-to-disk recording of up to four tracks simultaneously, plus the ability to mix down and layer as many as eight tracks simultaneously. An onboard DSP, capable of 50 MIPS, can be applied to the card's onboard synth or to audio routed through the card.

Mediatrix recently announced its **Audiotrix 3D-XG**, which will be based on Yamaha's **XG wavetable synth**, augmented by **Yamaha's 3D YMersion** surround sound audio processor. The 3D-XG will offer only 32-voice polyphony and 16-part multitimbrality, but the XG sound library's 676 voices and 21 drum kits are most impressive, thanks to the 18-bit DAC for MIDI instrument rendering.

The Audiotrix's onboard DSP can be used to process both MIDI data and audio streaming through the card, which will be capable of 16-bit, full-duplex digital audio.

In the Chips

Chip architects S3 and VLSI Technology recently announced new ICs that promise to deliver high-performance audio via the PCI bus. These products should start appearing in new systems in the second quarter of '97. After AMD's wholesale exit from the audio chip market, it's unknown how these new products might fare.

VLSI Technology's **SongBird**, using the company's ActiSound 3D technology, promises 32-voice wavetable synthesis, 3D positional sound localization, and Sound Blaster compatibility—even on the PCI bus. Instead of using ROMs, the SongBird's wavetable sounds will be dynamically loaded into system memory. Sound effects and instrument sounds will be stored in compressed form, then decompressed on demand. Designers will have the option of storing the samples in up to 4MB of ROM.

The SongBird will have 8K of onboard memory, plus it can address up to 64K of external SRAM for storing custom patches or effects. An integrated DSP will handle OPL2 and OPL3 emulation, and provide effects such as reverb, echo, chorus, pitch shift, tremolo, and vibrato. Tasks including sample-rate conversion, wavetable sample fetching, and sample decompression will also benefit from hardware acceleration.

The SongBird 3D also features five serial ports to support Zoomed Video, audio streaming, and Dolby AC-3 processing; an MPU-401 UART; S/PDIF I/O; a hybrid analog/digital game port, and a timer for synchronizing audio to video.

VLSI expects that the chip will start showing up in systems and add-in cards later this year, plus it's small enough for notebook motherboard designs.

When it comes to versatility, S3's **SonicVibes** chip is the only one that can run on either the PCI or the ISA bus. The chipset will integrate a 32-voice wavetable synth, a hardware MIDI interpreter, and an SRS 3D audio processor. Configured in an ISA PnP setup, the chip will store its wavetable samples in up to 4MB of ROM; in PCI designs, system memory stores sample sets.

S3's InfiniPatch technology provides an unlimited sound palette, enabling developers to include custom-designed patch sets with their products. SonicVibes' 128 instrument General MIDI patch set has been optimized for performance and playback, based on in-depth analysis of more than 3,500 songs and by allocating higher memory to the sounds and patches used most often.

The chip will be outfitted with five audio inputs (AUX1, AUX2, CD, Line-in, and Mic), plus an MPU-401 UART, a joystick port, and a line-out to amplified speakers. Like VLSI, S3 claims 100-percent Sound Blaster compatibility even on the PCI bus. S3 expects system and sound card manufacturers to announce SonicVibes-based products later this year.

— Bryan Del Rizzo

It only has 32 voices, and still resides on the ISA bus, but the Audiotrix 3D-XG should sound sweet.

S3 SonicVibes On Board
S3 SonicVibes On Board

The SonicVibes chipset is expected to be integrated into motherboard and notebook computers later this year.

product info

PRODUCT: SonicVibes
AVAILABLE: Q2 97
PRICE: OEM pricing only (about $30)
COMPANY: S3
PHONE: 408.980.5400
URL: www.s3.com

product info

PRODUCT: SongBird
AVAILABLE: Q2 97
PRICE: OEM pricing $25 in quantities of 10,000
COMPANY: VLSI Technology
PHONE: 408.434.3000
URL: www.vlsi.com

product info

PRODUCT: Sound Blaster AWE64; Sound Blaster AWE64 Gold
AVAILABLE: jan 97
PRICE: $199 (AWE64); $249 (AWE64 Gold)
COMPANY: Creative Labs
PHONE: 800.998.1000
URL: www.creativelabs.com

product info

PRODUCT: Freedom 5600
AVAILABLE: Q1 97
PRICE: less than $200
COMPANY: Diamond Multimedia
PHONE: 800.468.5846
URL: www.diamondmm.com

product info

PRODUCT: MAXISound Home Theater 64; MAXISound Home Studio 64
AVAILABLE: feb 97
PRICE: $249 (Home Theater); $299 (Home Studio)
COMPANY: Ubi Soft
PHONE: 800.824.7638
URL: www.ubisoft.com

product info

PRODUCT: Audiotrix 3D-XG
AVAILABLE: Q1 97
PRICE: TBA
COMPANY: Mediatrix
PHONE: 800.820.8749
URL: www.mediatrix.com

boot

reviews

KICKIN' THE TIRES ON THE LATEST **HARDWARE** AND TAKIN' THE NEWEST **SOFTWARE** OUT FOR A SPIN

H/W

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92 Altec Lansing **ACS55**
92 Aiwa **TS-CD40**
94 Smart **Video** Recorder
100 **Barracuda** 4LP
100 Tomahawk **9**
104 **Teac** CD-512E **12x**
105 Diamond 12x **Multimedia Kit**

S/W

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84 Hyper**Blade**
85 **Tomb** Raider
86 **Drowned** God
87 NASCAR **Racing 2**
87 **Screamer** 2
87 Marathon 2: **Durandal**
90 **Longbow:** FlashPoint Korea
90 Command & Conquer: **RedAlert**
94 ZPC
95 **Norton** Utilities **2.0**
95 First **Aid** 97
96 System **Commander** 3.0
98 **Internet** Fast**Find**
98 **Java** Café
99 **Cyber**Gladiators
99 Pray for **Death**
101 **Partition**Magic 3.0
102 **Basketball** Roundup
104 Un**Installer** 4
105 Sky**Net**
106 **Castle** Infinity
106 Virgil **Reality**

H/W

Compaq Presario 8772

The beat of a different drum

the bundle

Microsoft Works • Quicken Special Edition • Compton's Interactive Encyclopedia • CorelDraw 5 • Cakewalk Express • Pointcast • Netscape Navigator 3.0 • MechWarrior 2 (for PowerVR) • Flight Unlimited (for PowerVR) • Pod (for MMX) • The Ultimate Human Body 2.0 (for MMX) • Timetables of Technology (for MMX)

Compaq tends to dance to the beat of a different drum, and the Presario 8772 is no exception. This 200MHz MMX head banger comes with enough lusty features to spawn a mosh pit, but some of Compaq's design decisions and component choices left us feeling a little out of step.

The 8772 is physically identical to the 8710 (reviewed in *boot* 02). You have to look deeper to find differences. Let's begin with its sexiest differences: Intel's 200MHz Pentium with the MMX instruction set heads the list. Software must be specifically written to take advantage of the MMX instruction set, but all programs will benefit from the P55C's 32K of Level 1 cache (earlier Pentiums have 16K of L1 cache). Like the 8710, the 8772 has a generous 512K of pipeline burst Level 2 cache.

Intel claims a 20 percent overall performance boost for the MMX chip. We compared it to the benchmarks of Compaq's previous high-end Presario, the model 8712, and discovered much higher performance in many areas. But since Compaq has upgraded a number of other components, too, it's difficult to pinpoint exactly how much of that performance boost is due to the new CPU.

Everybody loves a machine with plenty of RAM. The 8772 has a whopping 48MB of Synchronous DRAM.

The 8772 comes with a high-performance 6.5GB hard disk. (The unit we tested had a 3.5GB drive that delivered excellent benchmark results; Compaq claims the higher-capacity drive offers similar performance.) The ultra-fast 16x Max CD-ROM drive boasts a maximum data transfer rate of 2400MB/sec.

The different beat that this machine dances to starts—faintly, like the distant drums in the jungle of a Tarzan movie—when you open up the 8772's case. Instead of putting its expansion slots on the motherboard, the 8772's daughterboard is housed in a massive steel cage.

DOUBLE TAKE

THE 8772'S GRAPHICS ABILITIES LEAVE ME COLD. THE S3 TRIO64V2/GX LACKS BUILT-IN VESA 2.0 SUPPORT. THE POWERVR 3D ACCELERATOR SHOWS PROMISE, BUT REMAINS UNPROVEN. THIS MAY BE AN "ULTIMATE" SYSTEM, BUT NOT FOR YOUR EYES. – CD

The drums grow to a Charlie Watts backbeat when you see the PCI card with the controversial NEC PowerVR 3D graphics accelerator. To date, Compaq is the only computer manufacturer to choose PowerVR; not even NEC's computer division is using the part.

That's not to say the PowerVR is an inferior 3D solution; it's just that fewer developers have chosen to port their games to that chip than, say, the 3Dfx Voodoo or Rendition's Vérité. This situation could change as Direct3D becomes more pervasive, but it's anyone's guess as to when that will happen. Compaq does bundle PowerVR versions of *Pod*, *MechWarrior 2*, and *Flight Unlimited*.

By the time you've reached the AMD InterWave-powered sound card, the drumbeat crescendos into a frenzied, Buddy Rich solo. Compaq claims 99 percent of all games will work, but if you're a hardcore DOS game player, you will encounter games that won't. Now that AMD has ceased development of the InterWave, Compaq will eventually have to choose another solution.

Heeding the beat of a different drum ain't necessarily a bad thing, but the Presario 8772 has two left feet when it comes to two critical components: its 3D graphics accelerator and its sound card. The rest of the package, however, had us boogying in the aisles.

— *Michael Brown*

+	–
COUNT 'EM! 48MB OF SDRAM • MAMMOTH 6.5GB HARD DRIVE • FAST 16X MAX CD-ROM DRIVE • EASILY ACCESSIBLE AND EXPANDABLE • GREAT SPEAKERS	• DARKHORSE 3D GRAPHICS SOLUTION • SOUND BLASTER COMPATIBILITY ISSUES

under the hood

the brains

CPU	200MHz Intel Pentium with MMX
External Cache	512K pipeline burst
RAM	48MB SDRAM, (80MB max)
Video	S3 Trio64V2/GX with 2MB SGRAM; NEC PowerVR chipset with 2MB SGRAM plus 4MB EDO DRAM for textures

the brawn

Hard Drive	6.5GB EIDE (various OEMs)
CD-ROM	16x Max IDE-ATAPI (various OEMs)
Expansion Bus	Three full-length PCI (two open); four full-length ISA (two open)
Fax/Modem	33.6Kbps; support for DSVD; upgradeable to 56Kbps

the beauty

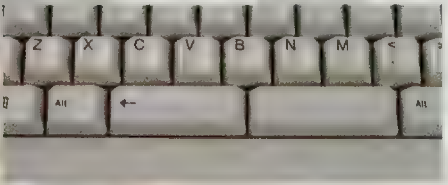
Monitor	Compaq 1725 17-inch ($749 option)
Sound Card	AMD InterWave wavetable synth with 1MB samples in ROM, plus 512K of sample RAM
Speakers	JBL Pro Premium speakers with subwoofer
Other	Two USB ports, ThrustMaster Phazer game pad

the goods

Compaq's Presario 8772 features a ton of RAM, hard disk storage to spare, and a very fast CD-ROM drive. Its future as a 3D gaming platform, on the other hand, is unclear because NEC has convinced few developers to support it.

How Fast is Fast?

Don't get too excited by the 16x Max moniker on the CD-ROM drive: It is capable of 16x speed—2400K/sec—but only part of the time. When the disc is reading data from the innermost tracks, its data transfer rate drops to that of an 8x drive. Nonetheless, the drive performed almost like a hard drive, with an average data transfer rate of 1040K/sec. The average access time of 120ms is also exceptionally good, although not hard-drive class.

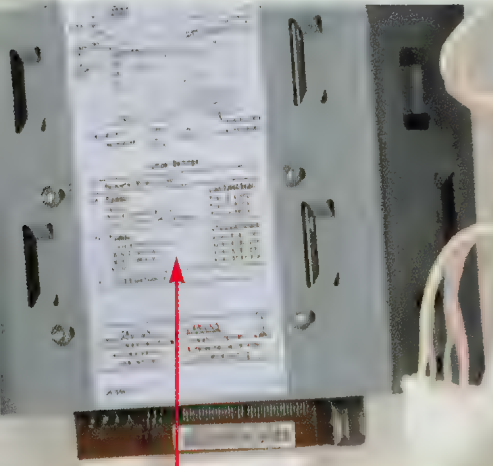


Pump Up the Volume

Compaq's 17-inch monitor has a volume-control knob on the front panel, plus handy analog controls for brightness and contrast.

Ergonomics Gone Awry

Check out this weird keyboard: The spacebar has been split in two and the left half turned into a second backspace key.

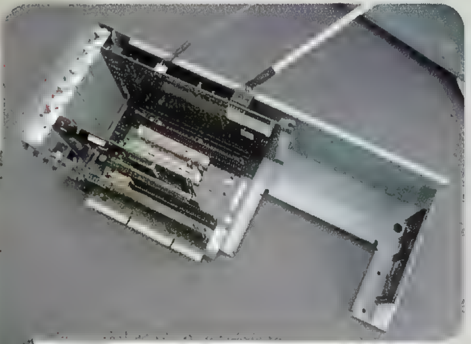


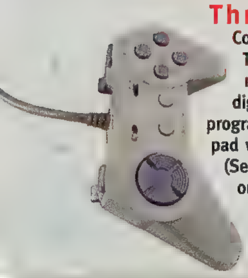
Hey Buddy, Can You Spare a Gig?

Compaq is bundling a massive 6.5GB hard drive in the 8772. If you need even more storage, there are two 5.25-inch drive bays open.

Canned Heat

The card cage houses a daughterboard with the 8772's PCI (two open; one occupied) and ISA (two open; two occupied) slots.





Give Me More Thrust!

Compaq bundles ThrustMaster's new Phazer digital/analog programmable game pad with the 8772. (See *boot* 04 for our hands-on review of the Phazer.)

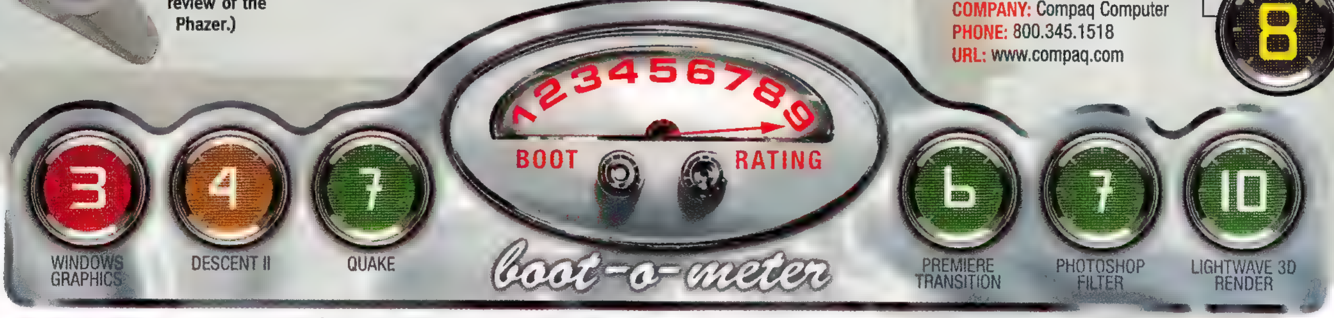
Spill Your Guts

Rip this card cage out of the Presario and you gain access to all its internals. Adding cards to the machine's slots is a breeze. The DIMM slots (one open, one occupied) are also very accessible.

boot verdict

PRICE: $2,999
COMPANY: Compaq Computer
PHONE: 800.345.1518
URL: www.compaq.com

8



A complete breakdown of benchmark results is available on the *bootNet*. Point your browser to www.bootnet.com

HP Pavilion 7370V

Give us expansion, or give us death!

The presence of a 200MHz MMX processor and a Righteous 3D card in the Pavilion 7370V is proof positive that HP wants to build a machine for power users. The eye-popping benchmarks this machine achieved are further proof. The fact that all of this computer's PCI slots are filled, however, is proof that the Pavilion needs a new motherboard design.

After reviewing three Pavilion systems, we realize we're beginning to sound like a broken record on this score, but having only two PCI slots in a modern PC is a major problem—unless you don't plan on expanding your machine (yeah, right, and monkeys might fly out of your butt!).

It's not as though there isn't enough room inside the case. After all, there are *five* ISA slots on the 7370V's riser board. You'll probably use one of them for a new sound card, because the Yamaha OPL3-SA synth on the motherboard supports only FM synthesis in hardware, with a software synth delivering wavetable audio. (You sure as hell won't be installing a PCI sound card.) Meanwhile, you won't be able to add such PCI components as a LAN adapter, or a SCSI host adapter, or a faster 2D graphics accelerator, or a... well, you get the picture.

HP has added two USB ports, a feature that was sorely lacking from their previous top-end model, the 7295V (see our review in *boot* 05). Having 32MB of memory onboard is also nice, but you'll have to remove the riser board to add more.

Thanks to the 32K cache on the MMX CPU—and a high-performance CD-ROM and hard drive—the 7370V outperformed HP's previous high-end model, the 7295V, by a country mile. Its 2D video performance was also substantially better. *Pod*, the first MMX game to hit the market, looked fabulous, with ultra-fast frame rates, smooth animation, and a 16-bit color palette. The game will also take advantage of the 3Dfx-powered Righteous 3D card, however, so the graphics should look even better. Unfortunately, HP has decided against bundling *Pod* with this system, which means only one MMX title will ship with the computer: the *EasyPhoto* image editing program.

Some of HP's component choices are sweet; others are not. The 34000 hard drive, for example, was wicked fast, delivering an average data transfer rate of 1250K/sec. The 16x Max CD-ROM drive pushed CD-ROM performance off our scale, delivering an average data transfer rate of 1070K/sec with an average access time of just 115ms. As with all CD-ROM drives that use a combination of constant linear velocity and constant angular velocity to boost data transfer rates, you'll achieve the maximum speed of 2400Kbps only part of the time, and then only when you're retrieving very large files in a continuous stream.

On the not-so-sweet side, HP still packs a pair of passive Altec Lansing speakers (at least they're throwing a powered Altec subwoofer in the box now). And the garish, nonprogrammable Logitech game pad inspired no one to fire up the included games.

The 7370V is aggressively priced. It has a fast MMX Pentium, one of our favorite 3D graphics accelerators, and it delivered great benchmark results. But when the time comes to add that next peripheral, you'll be cursing those two PCI slots.

— *Michael Brown*

Brilliant Idea!

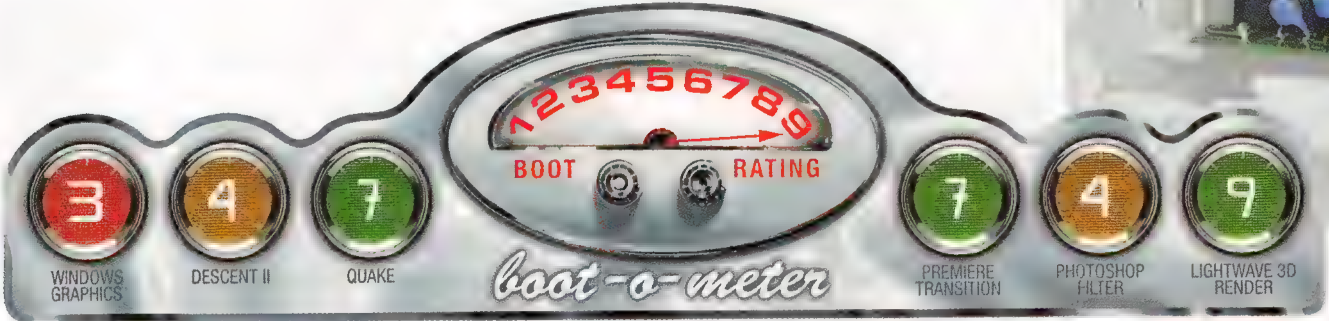
This is the best idea for a keyboard we've seen in a long time: With the touch of a button, you can retrieve your voice messages, activate the speakerphone, control the CD player, and adjust the volume. There's even a button for launching your web browser and another button that you can program with shortcuts.

Like. Like. Don't Like

The 7370V has one of our favorite 3D graphics accelerators—the Righteous 3D—in one PCI slot. The unit we reviewed had a cool-but-optional video teleconferencing card installed in the other PCI slot, leaving none left for other devices.

DOUBLE TAKE

GIVE IT A REST MIKE! NOT EVERYONE NEEDS THE TWO PCI SLOTS; BESIDES, THE 7370V IS $200 LESS THAN COMPAQ'S MMX OFFERING. BUT SINCE GAMES WILL ULTIMATELY BE THE SHOWCASE FOR MMX, HP'S DECISION TO OMIT POD IS PUZZLING. -BDR



A complete breakdown of benchmark results is available on the *bootNet*. Point your browser to www.bootnet.com

under the hood

the brains

CPU	200MHz Intel Pentium with MMX
External Cache	256K pipeline burst
RAM	32MB EDO DRAM (128MB max)
Video	S3 ViRGE with 2MB EDO DRAM; Orchid Technology Righteous 3D with 3Dfx Voodoo Graphics chipset and 4MB EDO DRAM

the brawn

Hard Drive	4GB, Western Digital Caviar 34000
CD-ROM	16x Max, Goldstar CRD-8160B IDE-ATAPI
Expansion Bus	2 full-length PCI (none open); 5 full-length ISA (four open)
Fax/Modem	33.6Kbps data/14.4Kbps fax; support for DSVD; **not** upgradeable to 56Kbps

the beauty

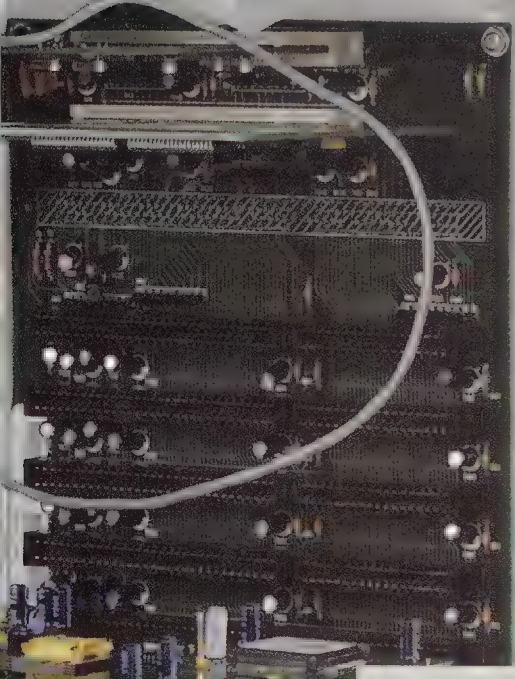
Monitor	HP D3859A 17-inch ($749 option)
Sound Card	Yamaha OPL3-SA FM synth with software wavetable synth
Speakers	Custom Altec Lansing passive speakers plus powered subwoofer
Other	2 USB ports; Logitech Thunderpad game pad; EasyCam video teleconferencing system ($299 option)

the bundle

EasyPhoto (for MMX) • MechWarrior 2 (for 3Dfx) • Whiplash (for 3Dfx) • Full Tilt Pinball • TripMaker SE • Blockbuster Movie Guide • Billboard Music Guide • Microsoft Works • HP Appointment/Phone Books • Photo Finish • Quicken SE • Intuit Investor Insight • HP Financial Calculator • Compton's Interactive Encyclopedia • Artrageous • Nile: Passage to Egypt • FreePhone • Oregon Trail II • The Great Word Adventure • The Great Math Adventure • Tuneland • Universe According to Virgil Reality • Syncro Connect • Interactive TV Guide • First Aid Recovery Kit • TalkShop • McAfee Virus Scan

the goods

The Pavilion 7370V is loaded to the gills, but it's cramped in terms of expansion opportunities. HP endowed the machine with just two PCI slots—and they were both occupied in this review unit. This puppy's no slouch when it comes to performance; it delivered some of the best benchmarks we've seen.

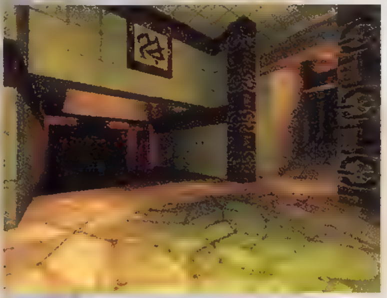


More, Please

This is the perfect example of why two PCI slots are inadequate. The 7370V would be a much better machine even with just one more PCI slot.

MMX is for Real

If you buy the 7370V, don't look for *Unreal* in the box because the game won't ship until at least June. Developer Epic MegaGames has refused every magazine's request for a copy of the work in progress—every magazine except *boot*, that is. Even without the benefit of a 3D accelerator, *Unreal* has to be seen to be believed. This could be the definitive MMX game. Based on what we saw of *Pod* and *Unreal* running on the 7370V, it looks as though Intel will deliver on the hype that has preceded the arrival of MMX.

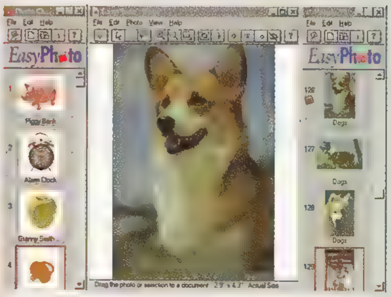


I See U

HP's optional video teleconferencing solution consists of Diamond's PCI interface card and Philips' EasyCam digital video camera.

Wow! Watch That Screen Refresh!

HP's decision not to bundle *Pod* with the 7370V is odd. The racing game is the first to take advantage of MMX and it looks fabulous, with very fast frame rates and 16-bit color palettes. That leaves *EasyPhoto* as the only title in HP's bundle to take advantage of the MMX instruction set.



+	–
•200MHz Pentium with MMX	•Only two PCI slots
•Righteous 3D graphics accelerator	•Difficult to access SIMMs and CPU
•Fast hard drive and CD-ROM drive	•Yamaha OPL-3SA FM synth
•Innovative keyboard	•No MMX games in the bundle
•Massive software bundle	

boot verdict

PRICE: $2,799
COMPANY: Hewlett-Packard
PHONE: 208.323.4663
URL: www.hp.com

7

Sharp PC 9080

Multi-media mess

The Sharp PC 9080 packs more features than seems possible on a lap, with built-in video capture, composite NTSC out, modem, CD, floppy, sound system, and high-res display. But, although it excels in a few areas, the 9080 falls far short of being the all-in-one do-everything box it promised to be. Sharp threw in the kitchen sink, but forgot to check the plumbing.

The 9080's most significant empty promise is its video-out capability: it works, but is next to useless. It's capable of only 640x400 (*not* 480) resolution, and it only works in Windows. Few programs are formatted to run at such a resolution, and many flat-out refuse to run at that res. The image quality on an NTSC monitor was distorted and letterboxed (with the top and bottom of the screen bordered by blackness). Enable NTSC-out, and the computer's LCD goes black: Simultaneous display is not supported.

The 9080 *does* support simultaneous display on the LCD and an external VGA monitor, but here again, the image on the external monitor was bowed and distorted. When we shut down output to the LCD, the external monitor's display looked fine.

Other problems include buggy MPEG playback that often failed to display at all, and the inability to run DOS games on the LCD in anything other than a tiny window—most notebooks offer a BIOS setting that stretches the video to full screen. The graphics chipset does not provide support for VESA 2.0, so you're limited to a few DOS video resolution settings.

The 9080 features a fast 6x CD-ROM drive. In fact, it's actually faster than the machine's hard drive. That was a first for us, and we could find no good explanation (neither could Sharp, for that matter). The slow hard drive is probably what caused the lost frames and choppy results in our video-capture tests, but the quality of the captured images was poor and pixelated anyway.

Video troubles and hard drive speed aside, the 9080 does have some fine features. The 1024x768 64k color active-matrix display is beautiful and bright—one of the best LCDs we've seen. The keyboard has a good feel, and the glide-point track pad is responsive. But with so many promises left unfulfilled, the Sharp PC 9080 just left us wanting.

— *Chris Dunphy*

DOUBLE TAKE
IF YOU DIDN'T CARE ABOUT ALL THE VIDEO CAPABILITIES, THE 9080 WOULD MAKE A GREAT NOTEBOOK; BUT THEN, WHY BOTHER BUYING A NOTEBOOK THAT CHOKES ON ITS OWN SPECIALTY?
-BD

under the hood

the brains

CPU	133MHz Intel Pentium
External Cache	256K pipeline burst
RAM	16MB EDO DRAM (48MB max)
Video	S3 86CM65, 2MB RAM frame buffer

the brawn

Hard Drive	Hitachi DK213A-13 1.3GB
CD-ROM drive	Matsushita 6x, model UJDCD6730
Expansion	2 Type II PC cards or 1 Type III, Zoomed Video Port compliant; Optional snap-on port replicator
Lap Weight	7 pounds, 5 ounces
Carrying Weight	8 pounds, 5 ounces

the beauty

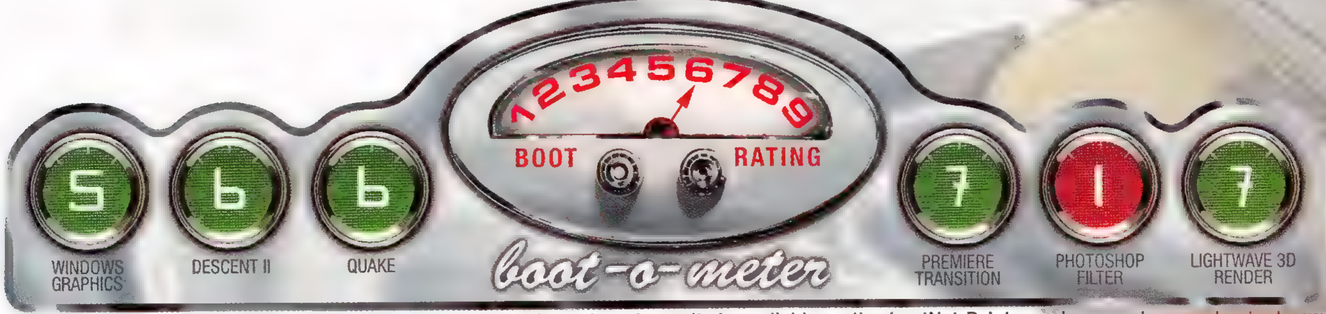
Display	12.1-inch 1024x768 active-matrix LCD
Sound	Sound Blaster 16 compatible (chipset unknown)
Video	1024x768 max res, 65k colors
Speakers	Stereo speakers; line-in/out jacks
Communications	Built-in 28.8Kbps modem; IrDA-compliant 4MB/s infrared port

Videodrome

The video features of the 9080 leave a *lot* to be desired. Poor quality and quirky limitations are the rule. NTSC-out is limited to Windows only, and only in the nonstandard 640x400 resolution. Video capture is pixelated and hiccups continually. Video-out is via a composite jack only; video capture allows either composite or S-Video input.

Have it Your Way

You can have both CD and floppy connected if you're tethered to AC, but on the road you must decide to do without one or the other—the battery consumes one of the two bays. If you can go without both drives, you can plug in two batteries for extra time on the road. Battery life for a single lithium-ion battery hovers around the two-hour mark, and there is a handy back-up battery that will power the notebook in standby mode for about 10 minutes, giving you plenty of time to hot swap a fresh one. The hard drive is removable with a single screw, but the cable is delicate, so this is not a procedure for the fainthearted. With all its pieces, the 9080 weighs in at a middling 8.5 pounds.



A complete breakdown of benchmark results is available on the *bootNet*. Point your browser to www.bootnet.com

the bundle

Microsoft Windows 95 • Microsoft Internet Explorer • Netscape 2.0 • Puma Technology's TranXit • Import/Export • CompuServe • AOL • Official Airlines Guide, • Presentation F/X • PC-cillin '95 Virus Scanner • ProImage Plus 2.1 • Dow Jones Personal Edition

real-world battery life

01:18:00

Rich and Bright

The 1024x768 active-matrix LCD delivers plenty of visual workspace. There's enough video memory for 16-bit color at all resolutions, and 24-bit color at 800x600 and below. (The LCD itself only resolves 262,144 colors, though.) Colors are rich and bright, and the display remains readable across a wide field of angles.

the goods

The Sharp PC 9080 packs a lot into a small package, but fails to get much right.

Power to Go

The power adapter built into the 9080's case is great; so there's no need to carry around a bulky AC converter brick. But as an unfortunate side effect, there is no way to provide a DC power input, such as a car lighter-socket adapter.

Pro Compatibility

The 9080 has Sound Blaster Pro-compatible sound capabilities, with an FM-synth MIDI. The stereo speakers are above average for a notebook, and there's a handy volume dial on the side of the case. There's a mic built into the lid, plus a mic-in jack and jacks for stereo line-in and line-out on the sides.

The Case for the Defense

There is no joystick port. But an internal 28.8 modem is provided. An IrDA port that supports both 1.1MB/sec and the new 4MB/sec standard is on the right side of the case. The case in front of the keyboard flips up to reveal two RAM expansion ports, that when equipped with two 16MB modules, bring the total up to 48MB. The case has sturdy flip down feet to prop up the keyboard.

+	–
•Beautiful 1024x768 display •Built-in AC adapter •Built-in 28.8Kbps modem •4MB/sec IrDA-compliant infrared port	•Slow hard drive •Worthless TV-out support •Poor video capture quality •No DC power input

boot verdict

PRICE: $4,499
COMPANY: Sharp Electronics
PHONE: 800.237.4277
URL: www.sharp-usa.com

5

S/W

Try it out! demo on the boot Disc

NewBeat Trancemission

Attention all armchair ravers

If you don't know your Jungle from Handbag from Detroit, but still want to perform mind-altering beats at your own house party, *NewBeat Trancemission* is for you. Start by selecting tracks from more than 250 samples of drum loops, bass lines, and synth washes. Then plug them into the "sequencer," and Boom! You're making music.

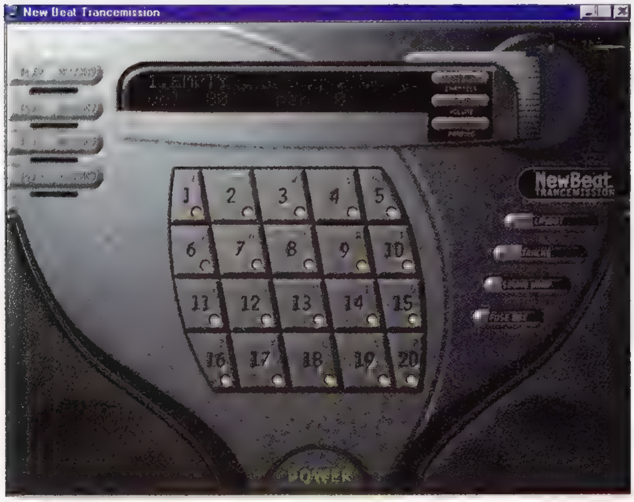
Well, kind of.

The interface, which really just allows you to mute and unmute individual tracks, will frustrate musicians. But the casual user will welcome the mistake-proof interface. All samples are either two, four, or eight seconds long, and the computer keeps everything in sync for you, so it's really hard to screw up.

NewBeat distinguishes itself from other "mix" programs by allowing you to record your own samples in the Sound Warp editor. Again, you're limited to two, four, or eight second samples, but once you get used to these confines, the potential for making actual music is great. There's also a separate drum machine program, the Fusebox. For non-drum programmers, the 16-note layout means it's incredibly easy to whip up custom beats. It would be better if you could import your own percussion samples into the Fusebox, because the drum samples aren't really what pro musicians would choose. Still, they get the job done. Just export your beat into the main sequencer, and you have your own royalty-free, home-made rave track.

NewBeat's only major drawback lies in its sounds. They sound dated. But "dated," in the fast paced techno world, can mean just a few months old. Nevertheless, anyone who wants to experiment with electronic music will find *NewBeat Trancemission* to be just the ticket. Just add a couple of lightsticks and a big Cat In The Hat lid, and you're set!

— *Adam Douglas*



***NewBeat Trancemission*'s main interface is simple—the numbered buttons activate a drum, bass, synth, or sample track and insert it into the mix in perfect time.**

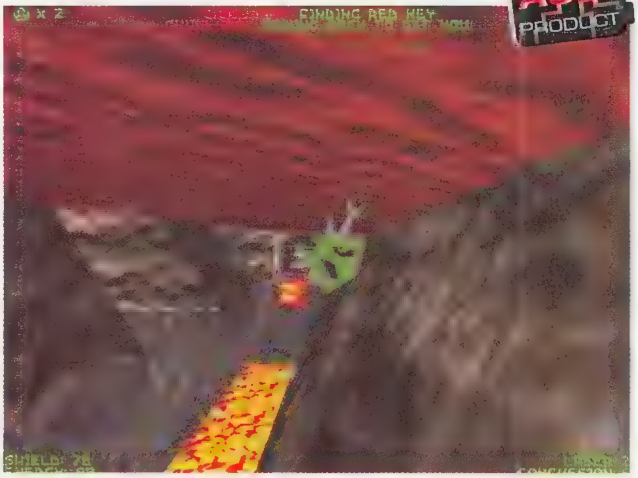
boot verdict

PRICE: $39.95
COMPANY: Microfurom
PHONE: 800.465.2323
URL: www.microforum.com

8

H/W

boot KICK ASS! PRODUCT

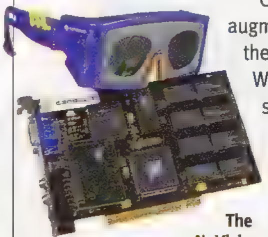


Playing the 3D accelerated *Descent II* on Canopus' Total 3D with stereo glasses on is enough to make your stomach churn, and your eyes dance with joy.

Canopus **Total 3D**

The ultimate Rendition

Fresh from designing Sierra's Kick-Ass award-winning Screamin' 3D (see *boot* 04), Canopus has refined their design and drivers, and come out with a Vérité-based card of their own, the Total 3D. And it rocks.



The NuVision designed LCD shutter 3D glasses do give a startling sensation of depth, but are not likely to receive broad support.

Canopus' new Windows drivers are topnotch, augmented by excellent display utilities for setting the refresh rate and making monitor adjustments. With 4MB of EDO DRAM onboard, the Total 3D supports 16-bit color in up to 1280x1024 resolution at 75Hz, and 24-bit color at 1024x768 resolution and 70Hz. Video playback is darn good (although Rage-powered boards still dominate software MPEG playback), with hardware X- and Y-interpolation, and the bundled *Total Cinema 95* MPEG player has the best interface we've seen.

But the Total 3D is not just a graphics card. The Spatializer sound circuit onboard broadens the apparent sound field. Depending on your tastes and the quality of your existing sound card, this can range from being a nice bonus touch to being redundant. A Windows control panel lets you modify and/or disable the effect.

Stereoscopic 3D-Spex LCD shutter glasses are also bundled with the Total 3D. These flash either eye with alternate screen frames. With a game that supports it, frame rate is halved but on-screen objects appear to have real depth. Beware: The effect is dizzying and can induce migraines.

The Total 3D delivers the pinnacle of Vérité performance, but for many the price may be too high, especially when compared to the $199 Screamin' 3D or the Intergraph Reactor's new $149 price tag. Still, Canopus has pushed their Windows drivers and board speed a step beyond the competition, so the Total 3D will not disappoint.

— *Chris Dunphy*

boot verdict

PRICE: $279
COMPANY: Canopus
PHONE: 800.649.9800
URL: www.canopuscorp.com

9

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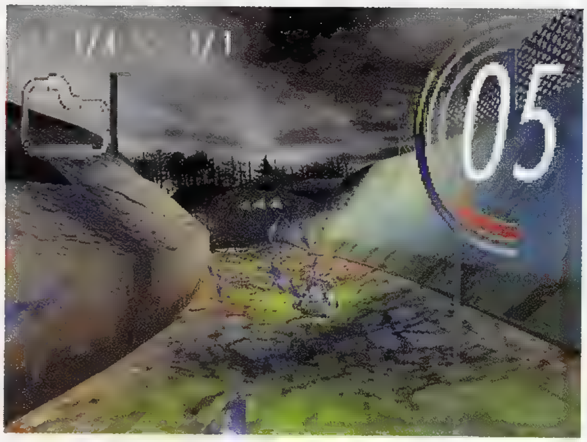
S/W

Scorcher

Go Speed Vexoid, GO!

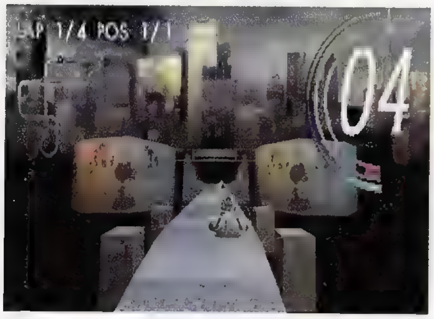
Try it out! demo on the bootDisc


Awesome light sourcing highlights *Scorcher*'s graphics engine.

Enter the world of *Scorcher*, an arcade-racing game bristling with intense visual delights.

You are a Vexoid—a hovering synergy of human and gyroscopic machinery—racing against your own kind on dark and twisting futuristic tracks that run the gamut from underground sewers to barren highways.

While the missing Direct3D support would have propelled SVGA performance to a whole new level, *Scorcher*'s DirectDraw visuals will fly fast and furious on most any machine. Five graphics resolutions (ranging from 320x200 to 640x480 in either 256 or 64k colors) mean *Scorcher* has a mode to suit most machines.


Scorcher's brooding cityscape is dark enough—even for Batman!

At 320x200, frame rates scream (easily passing 24fps on our 166MHz test system); and even maxed out at 640x480 in 64k color, *Scorcher* is remarkably playable. Utilizing almost every trick in the book (distance hazing that keeps annoying polygon pop-ups to a minimum, gray translucent cloud cover, colored light sourcing, as well as 2D background artwork and 2D sprites), *Scorcher*'s texture-mapped polygon racetracks are nothing short of spectacular. Choose from either a standard "behind the vehicle" arcade-style view or immerse yourself in *Scorcher*'s first-person point of view, which makes those trips down twisting tunnels quite nauseating.

Sound effects are curiously light, and the techno CD-audio soundtrack will have you thinking dance club rather than racetrack. Controlling your Vexoid with a gamepad can be a trying experience because you must push upward on the directional pad to propel forward while sliding left or right to veer—stick with your keyboard for maneuvering, jumping, and turbo-boosting.

Scorcher includes three modes of play (tournament, time attack, and practice), and six-player mayhem via LAN.

While *Scorcher* may catch your eye with its dazzling display of blazingly fast texture-mapped polygons, beyond the glitz lies uneventful gameplay. There's nothing here we haven't done before. These days, a race sim needs a little something more: hood-mounted guns, season mode with asset management, Gillian Anderson as the computer voice, whatever.

Scorcher is a vanilla racer that emphasizes the unadulterated blur of racing action. When it comes to *Scorcher*, only hardcore speed freaks need apply.

— *Andrew Sanchez*

boot verdict

PRICE: $49.95
COMPANY: GT Interactive
PHONE: 800.305.3390
URL: www.gtinteractive.com

8

H/W

CF-VEV611W MPEG-1 decoder

Swap your flop

Beneath the bland appearance lurks hardware MPEG acceleration... but centering your TV output will have you piddling around with those buttons.

Break out the popcorn, dim the lights, and boot up your Panasonic CF 62-series notebook computer. Panasonic's CF-VEV611W MPEG-1 hardware decoder makes watching movies on this notebook as simple as swapping your floppy with this hardware decoder.

Sigma Design provides the MPEG-1 decoding power, granting hardware playback of MPEG-1 data and Video CDs (version 1.1). Need to knock 'em dead on a wide-screen TV? S-Video outputs and a composite RCA jack turn your lowly notebook into a 640x480 SVGA presentation powerhouse. RealMagic and Panasonic software utilities control every aspect, while buttons residing alongside the video outputs control image centering on your TV.

Despite Sigma Design's hardware presence, don't expect to dive into RealMagic-enhanced games such as *Dragon's Lair*—in our testing, the game refused to acknowledge the existence of the needed equipment onboard. Nevertheless, MPEG-1 files played fine, enjoying the smooth full-screen playback that hardware-assisted playback grants.

Unfortunately, visual quality leaves a bit to be desired—faint pixelation haunts video playback (especially with solid blacks and whites). Video output was a mouse click away, but the extreme edges of the screen were clipped.

If you want *Top Gun* or *Wayne's World* cruising full-screen, full-motion on your Panasonic notebook, sacrifice your floppy drive for the CF-VEV611W MPEG-1 decoder.

— *Andrew Sanchez*

boot verdict

PRICE: $649
COMPANY: Panasonic
PHONE: 800.662.3537
URL: www.panasonic.com

6

S/W

boot KICK ASS! PRODUCT

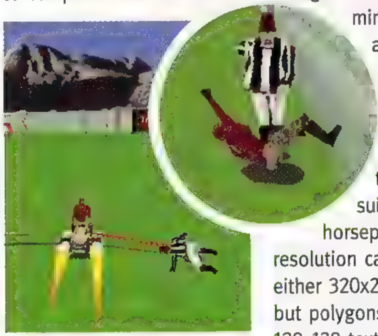
Try it out! demo on the bootDisc

Rocket Jockey

We have ignition

Rocket Jockey isn't bogged down with cinematic cut scenes or even much of a plot. Instead, it delivers a refreshingly original, balls-out racing experience.

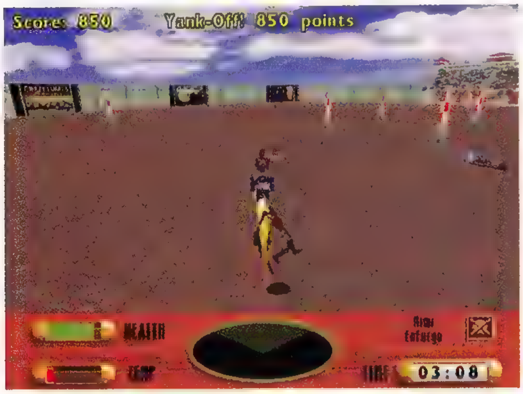
Straddle your jet-fueled steed and fire the engines to compete in three events: Rocket Race, Rocket Ball, and Rocket War. Kick butt and your name shows up on the leader board; anything less and you'll lose face... literally.



Antagonize the ref and he'll kick the crap out of you.

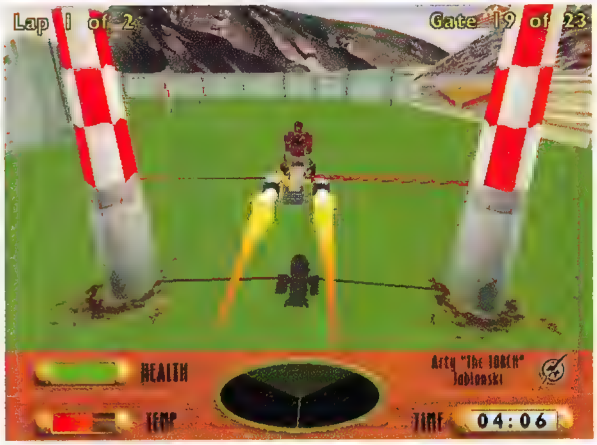
The action is fast and furious, with your 500-polygon rocket pulling a minimum of 20fps at maximum detail settings on a 133MHz-or-better box (detail can be tailored down to suit *your* machine's horsepower). Screen resolution can be set to either 320x200 or 640x480, but polygons are tiled with 128x128 texture maps at 128 to 256 colors. Still, Sega's custom blending technique manages to make this paltry palette palatable.

Oddly, there is no first-person view. Instead, you control the action from behind your jockey. You can rotate the camera anywhere in a 360° radius around the rider, but the only time that's worthwhile is when you're running around the field off your rocket, or viewing the grisly details in instant replay.



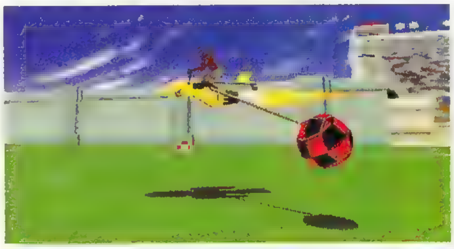
Score points by snagging your opponents and yanking them off their rockets; score even more by smashing them into the wall.

Gameplay is straightforward. Each rocket is equipped with a pair of grappling hooks on the ends of steel cables. Depending on the event, these are used in different ways. Rocket Race consists of running laps on a slalom course, flying through a series of flashing gates. The rockets have a terrible turn radius, but wrap a cable around the gate, and you can turn on a dime.



You'll get extra points by snagging your opponents on a clothesline.

In Rocket Ball, snag a huge ball with your cables and drag it to the net at the other end of the field, weaving through defenders all the way to the goal.



The balls in Rocket Ball vary in weight and properties. The Wrecking Ball smashes; the Super Ball bounces; and the Hockey Puck floats.

Rocket War is a gladiator-style game where you knock the other riders off their machines. Use the cables to clothesline your opponents, for example. The nastier you play, the more points you score. The referees walking the field are fair game, too. But tangle with one, and you'd better not let him catch you off your bike—he'll kick the living crap out of you.

Start with your choice of four rockets, each packing a different combination of speed and maneuverability. Amass points, and more powerful and menacing models become available. You can upgrade your cables and hooks, too. My favorites were adorned with barbed wire and exploding warheads.

Shortcomings? Sure. Multiplayer *Rocket Jockey* would be a riot, but we'll have to wait for the LAN-support patch promised by the time your read this (check the *bootNet* site; we'll have it first). If only you could create custom rockets, that would be choice. And the game only supports 3D graphics accelerators running Criterion's RenderWare API, such as the Matrox Millennium and Terminator 3D.

Still, there hasn't been a game as satisfying and addictive as *Rocket Jockey* in a long time. And the soundtrack, by Dick Dale—master of surf guitar—fully rocks. *Rocket Jockey* is an unmitigated blast.

— *Bryan Del Rizzo*

Tips and Techniques for Model Rocketry

- Turn off floor textures for optimal performance.
- For a tighter turning radius, fly in close to the pylon before shooting your cable.
- Bounce off the wall to turn sharply when you're going too fast. The ensuing damage will affect your rocket's handling, so don't use this tactic too often.
- Don't like your ride? Hijack your opponent's.
- Ram pedestrians for extra points.
- In Rocket Ball, fly low and tight to grab the balls, and fly directly into the net to score.
- Pick up bombs and fling them at your opponents.
- Use lawn anchors if you can't find a nearby pylon.
- In Rocket Ball, run over the referee, or hook him and fling him around the arena. No points, it's just fun to see him react.

boot verdict

9

PRICE: $49.95
COMPANY: SegaSoft
PHONE: 888.734.2763
URL: www.segasoft.com

H/W

F-16 Fighterstick

Give this one a big hand

Being flight-sim fanatics, we'd been drooling in anticipation of taking to the skies with the F-16 Fighterstick. When this high-end stick showed up, we tore into the box like hounds after steak tartare. A few hours later, a mild case of indigestion set in.

The F-16 Fighterstick certainly looks impressive; hence, the drool. Its handle is modeled after an authentic F-16 Falcon's stick, and it's equipped with one eight-way and three four-way hat switches, three fire buttons, a trigger, a rotary throttle, and trim controls.

But real fighter pilots must have ham-sized hands, because the handle on this puppy is an ergonomic disaster; hence, the indigestion. It's much too big, and the placement of the wrist rest makes it difficult to comfortably reach the eight-way hat switch. Sudden jerks of the stick, such as those applied in response to incoming SAMs, have the lightweight base flopping all over the desktop. A little extra weight would be much appreciated.

The Fighterstick handled well with *F-22 Lightning II* and *Apache*, although there were occasions when it felt *too* responsive; to the point of being squirrely.

The stick is programmable, so it requires both a joystick and a keyboard port. The keyboard connector has a pass-through for both AT- and PS/2-style ports, and a seven-foot cable delivers plenty of reach.

You can program each of the Fighterstick's 20 buttons with either macro strings or single-keystroke commands and organize them into control sets for different games. The programming interface is intuitive; it'll take just a few minutes to map the commands for a complex game.

CH's F-16 Fighterstick is a *big* stick.

Each control set must then be downloaded to the Fighterstick's EEPROM, but because this memory is nonvolatile, you won't need to reload it until you play a different game.

While you *can* use the Fighterstick with other devices, such as rudder pedals and throttles, it's not a good idea to mix programmable peripherals because potential interface conflicts may ground your system. CH's Pro Throttle, for example, overrides the stick. And the Fighterstick isn't compatible with CH Products' regular throttle.

The Fighterstick ships with more than 40 preconfigured game sets, for games such as *Descent II*, *EF2000*, *U.S. Navy Fighters*, and Jane's *ATF*. You can also download additional game sets from CH Products' web site.

Hardcore flight jocks will certainly appreciate the F-16 Fighterstick's extensive programmability, but they better have big hands or be prepared to fly short missions.

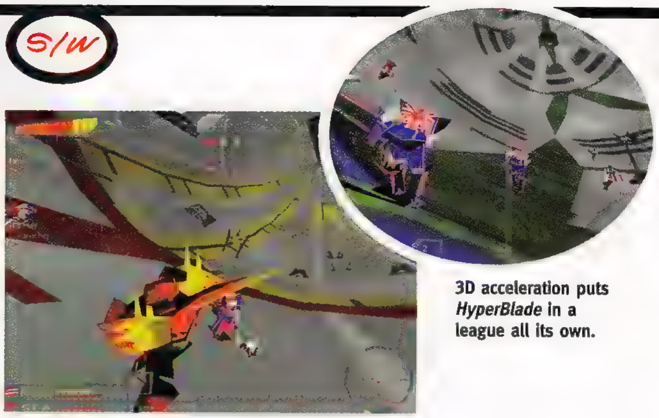
— *Brad Craig*

boot verdict

PRICE: $189.95
COMPANY: CH Products
PHONE: 619.598.2518
URL: www.chproducts.com

7

S/W



3D acceleration puts *HyperBlade* in a league all its own.

Skate fast or die slowly in the violent world of *HyperBlade.*

HyperBlade

Prepare for roller-blading bloodshed

HyperBlade is perfect for those who like a bit of the old ultraviolence.

In a violent future where players scream around inside the curved Drome, *HyperBlade* plays like hockey inside a blimp. To score, players must get the Rok past the opponent's goalie, and anything goes... including body parts. Witness the carnage from a fixed 'over-and-behind' camera angle (no first-person point-of-view is available).

Graphics quality and performance within *HyperBlade*'s bloody arena vary greatly depending on what you have under your hood. Owners of Direct3D-compatible video cards such as Rendition's Vérité: Prepare yourselves for a 640x480 16-bit, texture-mapped, polygon world, complete with dingy metallic Drome floor and vibrantly colored armored uniforms. Activision wisely sacrificed player polygon count in the name of faster frame rates (easily hitting 24+ fps with a fast machine and 3D acceleration). Without acceleration, you're left with a flat-shaded world, devoid of textures.

Motion capture propels *HyperBlade*'s pugilists into miniature hyperblading bulldozers, eager to mash their opponents into large chunks with an uncanny grace all their own. Performing 360° flips and half-pipe jumps becomes a study in human grace and control. Once again, Sound-Deluxe handles Activision's intense digital sound effects, from the roar of the blood-crazed crowd to the crunch of high-impact armor, with their usual commitment to high quality.

The play-by-play text, as well as the graphics, are violent, bordering on gross. You can hear dying players in the throes of agony. And *HyperBlade* makes it personal by giving in-depth descriptions and biographies of the poor bastards.

The killing and maiming, while graphic, seem pretty far removed from the human kind of suffering, considering the blocky, low-polygon count nature of the graphics. But there are some unsettling touches, such as players who keep twitching after losing their head or continue to suffer more injuries.

On the downside, this is a fairly limited game, with no season play, and the only championship is the Gauntlet, awarded to the player who can defeat all 12 teams in the league. *HyperBlade* is pretty boring solo, but get four of your buddies on a LAN and you can hack each other to pieces. Neither modem play nor Internet play is currently supported.

— *Lee Buchanan*

boot verdict

PRICE: $49.95
COMPANY: Activision
PHONE: 310.473.9200
URL: www.activision.com

8

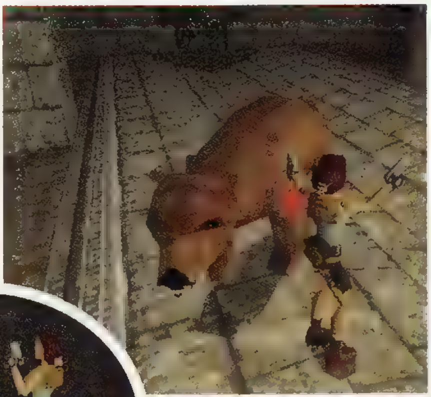
Tomb Raider

Wrong place at the wrong time

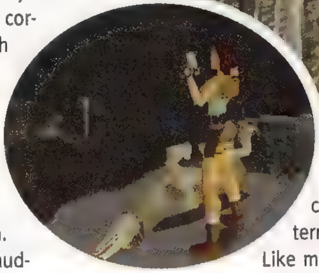
Try it out! demo on the bootDisc

The twin pistols blazed in the humid cavern, illuminating the woman's face like the candles on her 16th birthday cake.

Daring. That's a good word to describe *Tomb Raider*. You are Lara Croft, an adventurer with a flair for two-fisted gunplay and gravity-defying gymnastics, in her global quest to find a lost Atlantean artifact. Don't expect the mass carnage of *Duke Nukem 3D* or *Quake*—*Tomb Raider* is more *Indiana Jones*, with occasional spurts of bullet-ridden mayhem followed by hours of exploration in the forbidden corners of the Earth's mantle. Each of the 15 levels within *Tomb Raider*'s four SVGA polygon worlds boasts from 6,000 to 14,000 polygons and enjoys the luxury of texture maps and light sourcing, creating a sense of immersion rarely seen. Watching Lara shake her Gouraud-shaded polygon buttocks, hang off cliff walls, and swim beneath brackish waters is a testament to Core Design's outstanding keyframing animation team (no motion capture here, believe it or not).



Prepare to gun down fur-bearing critters John Woo-style in Eidos' *Tomb Raider*.



"Play dead, Mr. Wolf! *BANG!* Gooood boy."

From the "over-and-behind" camera view, to the animated texture maps (watch Lara grit her teeth when both barrels are ablaze), *Tomb Raider* seems like the femme fatale everyone wants it to be, but her shortcomings are visible.

While the SVGA world is displayed 640x480, wall texture maps are 64x64 resolution, resulting in pixelated cave walls when viewed up close. All textures were designed using a single 256-color palette, washing Lara's subterranean worlds in subdued tones.

Like many other PC games, a finite polygon count haunts *Tomb Raider*. Lara's 526-polygon body has blessed her with breasts that could poke a man's eye out.

But everything changes with 3D acceleration. 3Dfx and Rendition ports are available (patches are on the *bootDisc*) to boost Lara into the 30fps realm, increase her polygon count to the 10,000 realm, and polish the visuals with fixings including 64k colored textures on the Rendition version, bilinear filtering, mip mapping, etc. Without 3D acceleration, venturing into SVGA becomes frame-rate heartache. And with only two resolution modes to choose from (320x200 or 640x480) its a feast or famine affair. Detail levels can be adjusted, but you trade-off higher-resolution textures and perspective correction for blocky textures and massive texture-map warping.

SGI-rendered cut scenes attempt to give *Tomb Raider* a movie-like feel, but why bother? The in-game engine could have produced the cinematics, as in Origin's *Bioforge*, but *Tomb Raider*'s interlaced cinematics are just distracting.

A small handful of games successfully pull off sophisticated polygon collision detection and clipping—*Tomb Raider* isn't one of them. Lara stands inside seemingly solid stone steps and dead bears on a regular basis. The floating camera also has problems, as your viewpoint swings wildly to focus on the action—engaging as an observer, disorienting as a player.

Perhaps most disturbing is Lara's penchant for blasting the cave's native animals with extreme prejudice, so be prepared to gun down massive grizzly bears whose only crime seems to be being in the wrong place at the wrong time.

Tomb Raider, properly armed with the right 3D acceleration, breaks the PC gaming envelope—once and for all, surpassing the 32-bit console versions.

— *Andrew Sanchez*

boot verdict

PRICE: $49.99
COMPANY: Eidos Interactive
PHONE: 415.616.2022
URL: www.tombraider.com

6 | 8
unacceleated accelerated

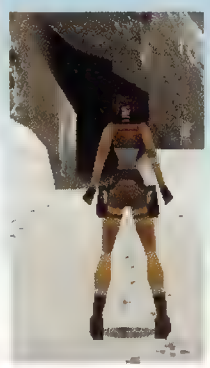
PC vs. PlayStation

How does *Tomb Raider* PC compare to its 32-bit console sisters?

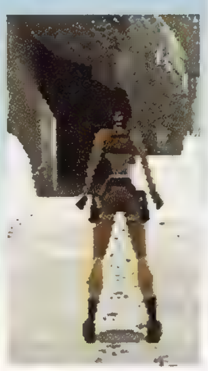
The PlayStation's dedicated GPU (Graphics Processor Unit) combined with its 32-bit R3000A RISC processor running at 33MHz makes for formidable polygon processing power. Two years ago, people were stunned into stupidity at the amount of light-sourced, texture-mapped polygons the PlayStation could push. Even today, games such as Namco's *Tekken 2* personify all that's awesome in Sony's 32-bit console. People thought the PC could never attain the type of detail a PlayStation achieves every day.

Think again.

Tomb Raider PC armed with either the 3Dfx or Rendition Vérité card smokes the PlayStation. While the cinematics are cleaner on the PlayStation (thanks to proprietary MDEC video decompression hardware), in-game graphics come up short. Texture maps on the console version have a grainy, speckled look to them, while the accelerated PC's bilinear filtering, mip mapping, antialiasing, perspective correction, and 640x480 resolution (compared to 384x256 for the PSX version) running at 30fps, is a fevered dream to the PlayStation's hardware. —*AS*



PC version.



PlayStation version.

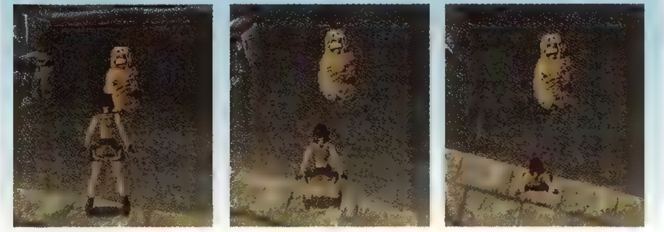
Look Ma! No Rotation!!!

Eidos' attempts to slip 2D sprite objects into a polygon world become painfully apparent when Lara looks around. As the camera view swings, these sprites can't rotate like true 3D objects. The same flat bitmaps stare at you, no matter which angle you view them—a big disappointment.

Watch the mummy in these three screen shots and you'll know what we're talking about. Some words of advice to game developers designing 3D polygon worlds: *Don't use 2D sprites.*

You've been warned.

—*AS*



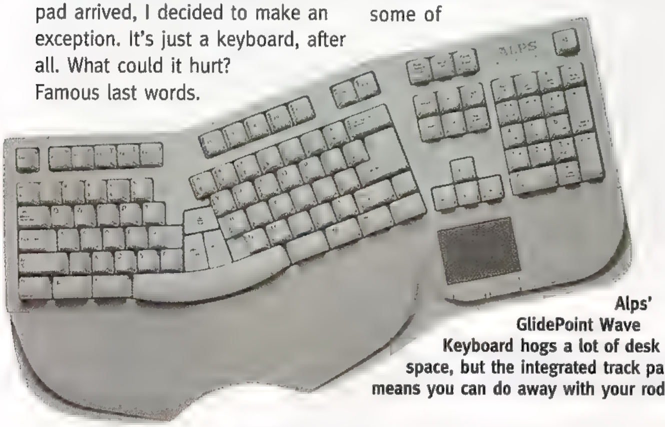
H/W

Alps GlidePoint **Wave Keyboard**

The waves are fine, but watch out for the undertow!

As a rule, I don't install evaluation equipment in my work computer. That's what the bootLab is for. But when the sexy new Alps GlidePoint Wave Keyboard with ergonomic split keypad and integrated touchpad arrived, I decided to make an exception. It's just a keyboard, after all. What could it hurt? Famous last words.

After installing the keyboard and its device drivers, my system utterly died, refusing to recognize any mouse, and Windows gagged on a non-fatal exception error with every launch. After dealing with some of the worst tech support imaginable, I finally extricated the bedeviled keyboard and its cursed drivers from my machine—without any help from Alps.



Alps' GlidePoint Wave Keyboard hogs a lot of desk space, but the integrated track pad means you can do away with your rodent.

I've since successfully installed the keyboard on two other systems in the lab, so my first experience was probably just an anomaly. Considering the pathetic support I received from Alps on the other hand, I can't say the weak quality of their tech support is an anomaly. After all, they treated me this way knowing I was a journalist reviewing their product.

I've really grown to like this keyboard (when I spend time in the bootLab, that is). Its 105 keys and integrated wrist rest are incredibly comfortable and intelligently laid out. Three buttons hang out in the split between the QWERTY keys, offering extra backspace, tab, and mouse functions. You can also tap the pad to click.

If you decide to buy a GlidePoint Wave Keyboard, I hope you have a better installation experience than I did. And don't lose that five-year warranty.

— *Michael Brown*

boot verdict

PRICE: $149
COMPANY: Alps Electric
PHONE: 800.825.2577
URL: www.alpsusa.com

b

S/W

Drowned **God**

We are not alone

Try it out! demo on the bootDisc

All of *Drowned God*'s graphics were rendered in *SoftImage*. The game looks like it was produced in *Director*, but the program was coded in C++.

Myst gave graphic adventure games a bad name. *Drowned God* will undo the damage.

Drowned God is filled with brain-buster puzzles tightly integrated into the story. And what a story this game has to tell. Designer Harry Horse (one-time antiquities forger Richard Horne) has constructed a game based on his belief that humans are descended from extraterrestrials; and that these alien beings are responsible for some of the most significant events in history.

A few of Leonardo da Vinci's secret drawings reveal evidence of extraterrestrial visitors.

This particular puzzle involves a debate between Einstein and Newton.

The object of the game is to recover ancient relics, including the Holy Grail, in order to reveal humankind's true origins. Recovering these relics requires that you travel through time, encountering famous figures (real and legendary) ranging from Leonardo da Vinci to Merlin to JFK.

Along the way, you'll accumulate an inventory of tools needed to solve puzzles and clear up the mystery. *Drowned God* offers an amazing story, but the puzzles are equally impressive. One of the best involves a pair of spinning mechanical heads: one of Albert Einstein, the other of Sir Isaac Newton. The heads spout nonsensical phrases ("I did not open Pandora," says Einstein at one point). But when you arrange the statements in their proper sequence, you're treated to a fascinating debate that could never have taken place.

Unlike some other games—*Zork Nemesis*, for example—*Drowned God* never takes itself too seriously. After you've solved the Newton-Einstein puzzle, Newton remarks "I told you it was too easy." Einstein replies: "Oh shut up, it was better than your damned apple puzzle!"

Drowned God has multiple endings, but the story unravels in a linear fashion. You won't play it over and over, but you *can* expect at least 40 hours of play before you reach the first ending. Even though every PC owner on earth has ponied up the bucks for *Myst*, *Drowned God* won't be everyone's cup of tea; but then, what game is?

— *Michael Brown*

boot verdict

PRICE: $49.95
COMPANY: Inscape
PHONE: 800.693.3253
URL: www.inscape.com

8

S/W

NASCAR Racing 2

Down-drafting to victory

Try it out! demo on the bootDisc

How do you make a great game even better? The answer must be more elusive than it seems, because sequels are rarely better than the original.

The exception is Papyrus' follow-up to its best-selling *NASCAR Racing*.

Papyrus has fixed the original's poor frame rate, using the improved *IndyCar Racing 2* engine. So although the stock graphics are much improved, this new version still outperforms the original. And the new game ships with a version tweaked for Vérité-powered 3D accelerator cards that sports even better graphics (bilinear-filtered texture maps) and blazing performance.

Audio was also upgraded, but it's the addition of a crew chief/spotter on the radio that'll really grab you. His speech is smooth and, most importantly, it's useful. "Slow car down low," he says, allowing drivers to focus on what's ahead. Your spotter also alerts you to trouble on the track: "Big wreck in turn three; stay low."

NASCAR veterans will find their prayers answered, and rookies will welcome new features that make this ultrarealistic simulation friendlier, such as arcade damage and steering help.

The push for intense realism may not be welcomed by all players. Real race cars don't have speedometers, so you won't find one here. Instead, you rely on the tach. And real racers can't stop the race to pay the pizza man at the front door. So the developers removed the Save-Game feature. While this is sure to upset some, it's hard to argue with Papyrus' devotion to realism.

— *Lee Buchanan*

boot verdict

PRICE: $49.95
COMPANY: Sierra On-Line
PHONE: 800.757.7707
URL: www.sierra.com

9

Screamer 2

Pedal to the polygon metal

Try it out! demo on the bootDisc

boot KICK ASS! PRODUCT

If you think coin-op arcade games are still light years ahead of the PC for white-knuckle gaming, then you need to check out *Screamer 2*. Virgin Interactive's follow-up to their PC racing sensation delivers more of the same full-throttle thrills that made the original a real head turner. Make no mistake: There ain't no strategy here, just flat-out fun.

The graphics are plain gorgeous, and, with enough horsepower on your desktop, the lush texture-mapped polygon terrain and vehicles rush by so fast you'll swear you feel the wind in your hair. If you don't have enough machine to run the 640x480 graphics, the game still rocks in 320x200 (both modes playable in either 8-bit or 16-bit color).

Race through England, Egypt, the United States, and Finland; each with its own distinctive and treacherous terrain. Run against the clock, or race computer-controlled cars in single events or a full championship. And naturally, you'll want to run your flesh and blood buddies off the road, so there are multiplayer options galore, including network play supporting eight players and a split-screen mode for two-player action on one PC.

Gameplay lives up to all expectations. The car's handling physics are much-improved over the original—when you scream into the sand on the Egypt track, be prepared to broadslide through the turns.

Save your quarters. *Screamer 2* will have you screaming for more, and it's only a mouse click away.

— *Lee Buchanan*

boot verdict

PRICE: $19.99
COMPANY: Virgin Interactive
PHONE: 800.874.4607
URL: www.vie.com

9

Marathon 2: Durandal

A poor man's Doom

Try it out! demo on the bootDisc

Right off the bat, let's not forget why *Marathon* was created: Because Mac users couldn't play the real thing, *Doom*. That said, how does this retro port stand up in the age of *Quake*, *Tomb Raider*, and *Unreal*? Very poorly, thank you.

If you just read the spec sheet, you'd believe *M2:D* could hang with these big boys: 640x480 graphics in 64k colors, up to eight players competing on the LAN, and an innovative 16-bit active-panning stereo feature that's actually effective.

It's the wimpy 2D sprite characters and garish palettes that really hurt *M2:D*. It's all a matter of taste, but the skinny bugs and floating dudes in bathrobes that roam and skitter through the halls of *Marathon* don't invoke the fear of *Doom*'s Barons from Hell or *Quake*'s fiends. And the canned animated splash of green goo when a bug is blasted pales beside the sight of a *Quake* opponent's dismembered body parts bouncing down a staircase and kerplunking, one by one, into a moat.

Mac loyalists will whine that the *Marathon* series surpasses all PC comers because it has a *true* storyline. That's all good and fine. But when the empty cartridges are flying and you can feel the hot breath of a chainsaw-packin' ogre on your neck, all that story nonsense somehow seems... unimportant.

— *Brad Dosland*

boot verdict

PRICE: $39
COMPANY: Bungie
PHONE: 800.295.0060
URL: www.bungie.com

4

WinBook FX

Turn the page

The WinBook FX packs a lot of firepower, including a 133MHz Pentium and 32MB of EDO DRAM, so we expected relatively high benchmark results. The good news is: Our real-world test results were off the scale. The bad news is: They were off the wrong end of the scale. It may have the guts, but the WinBook FX doesn't deliver the glory.

Some of those disappointing results can be attributed to the FX's video subsystem. WinBook's decision to use the Cirrus Logic GD7543 chipset, a two-year-old part that's already been supplanted by the GD7548 (which, in turn, is about to be replaced by the GD7555), was obviously motivated by cost—not performance—considerations. And with only a meager 1MB of video DRAM to play with, the FX nearly choked on the applications we threw at it. Rendering a wireframe image in *Lightwave 3D*, applying a Gaussian blur in *Photoshop*, and rendering a video transition in *Premiere*, all took atrocious amounts of time, resulting in straight one ratings across the boot-o-meter real-world tests.

On screen, the FX delivers a maximum resolution of 800x600 with 65k colors on its bright 12.1-inch LCD, or 1024x768 with 256 colors on an external monitor. But that two-year-old video chipset isn't compatible with the new Zoomed Video Port standard.

Aside from the video performance, the FX boasts a handful of handsome features, including a removable Toshiba 2GB hard drive and a Teac 6x CD-ROM drive (which shares a bay with the floppy drive). The hard drive delivered a solid transfer rate of 710K/sec, but the CD-ROM drive's 503K/sec was less than spectacular. If you can do without both the CD-ROM and the floppy drives, plug a second battery into the drive bay for those long airplane rides. Can't decide if you prefer a track pad or a pointing stick? The FX offers both. Other notable features include a standard 15-pin game port connector and a built-in 28.8Kbps modem with a Rockwell RC288ACL chipset.

The presence of a Vibra 16 audio chip ensures 100 percent Sound Blaster 16 compatibility, but your hands will muffle the stereo speakers built into the wrist rest. For optimal audio performance, plug a pair of powered speakers into the line-out jack.

Even if you're attracted by the $3,999 price tag, there are many better notebooks out there for the money. The FX could've been a contender if WinBook upgraded its video solution; as it stands, the FX just doesn't cut it.

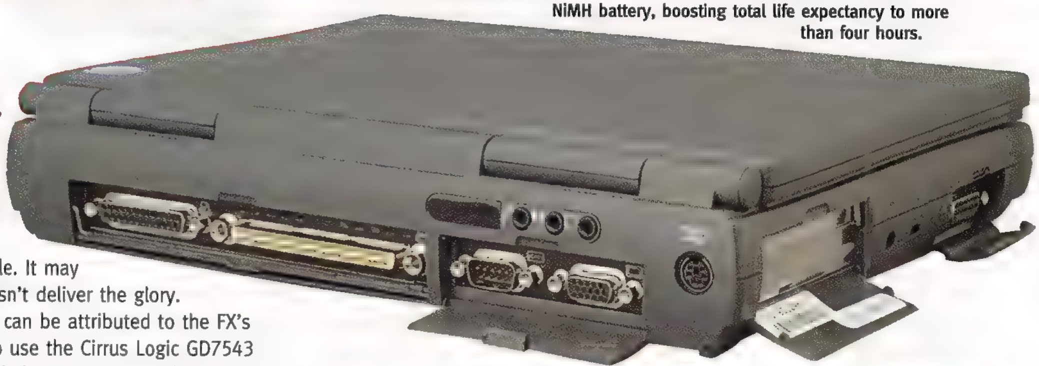
— *Bryan Del Rizzo*

DOUBLE TAKE

THE WINBOOK SEEMED TO HAVE THE MAKINGS OF A COOL NOTEBOOK, BUT THE LOUSY VIDEO PERFORMANCE COMBINED WITH LITTLE DESIGN FLAWS SUCH AS THE FUNKY SPEAKER PLACEMENT MAKES FOR A BORING OVERALL PRESENTATION. – AS

Connect the Dots

The WinBook FX features a bevy of ports and jacks, including speaker, mic, and headphone jacks. You'll also find the standard issues too, such as the PS/2, serial, parallel, IrDA, external monitor, and docking-station ports. The hard drive is removable and you can swap out the floppy or CD-ROM drive to add another lithium-ion or NiMH battery, boosting total life expectancy to more than four hours.



Chips Ahoy

Cirrus Logic's GD7543 chipset was a solid product when it shipped two years ago. Today, many notebook manufacturers have moved on to that product's successor, the pin-compatible GD7548. You'll find this chip in Gateway's Solo 2100, TI's TravelMate 6030, and Fujitsu's Monte Carlo (all reviewed in *boot* 04).

Whereas the GD7543 performs 2x video scaling through replication, the GD7548 performs arbitrary scaling with horizontal interpolation and vertical replication. The newer part produces video that's considerably less pixelated. The GD7543 also lacks an integrated video-overlay port, which means that you'll need external hardware to perform MPEG decoding and NTSC output.

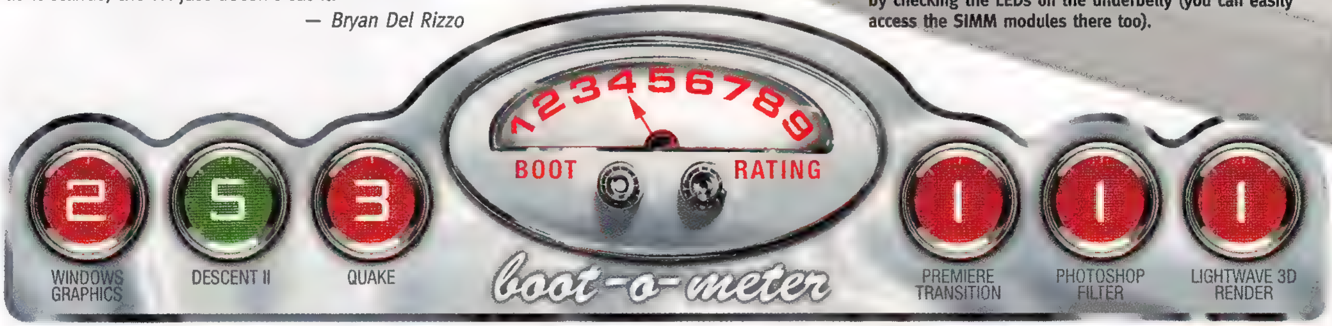
A spokesperson at Cirrus Logic revealed that their GD7548 chip will soon be succeeded by the GD7555, a 64-bit video solution offering both vertical and horizontal interpolation for even better image quality. Even if WinBook started plugging the GD7548 into the FX's socket, they'd still be lagging behind the technology curve. Time to catch up, guys!

Plug It In, Plug It In

With a carrying weight of more than nine pounds, you might be tempted to leave the power brick at home. Don't. It weighs substantially less than the second battery, and dishes out a full charge in only four hours.

Life Span

You can monitor battery life on the Windows desktop or by checking the LEDs on the underbelly (you can easily access the SIMM modules there too).



A complete breakdown of benchmark results is available on the *bootNet*. Point your browser to www.bootnet.com

under the hood

the brains

CPU......................133MHz Intel Pentium
External Cache.....256K pipeline burst
RAM.....................32MB EDO DRAM (40MB max)
Video...................Cirrus Logic GD7543, 1MB EDO DRAM

the brawn

Hard Drive...........Toshiba 2GB EIDE
CD-ROM drive.......Teac CD44E-900 6X
Expansion............2 Type II PC cards or 1 Type III
Lap Weight...........7 pounds, 13 ounces
Carrying Weight....9 pounds, 1 ounce (with power brick and floppy drive)

the beauty

Display..................12.1-inch active matrix
Sound...................Vibra 16 FM Synth (Sound Blaster 16 compatible)
Video....................800x600 max res, 65k colors (1024x768, 256 colors on external monitor)
Speakers...............Stereo, plus headphone jack
Communications...28.8Kbps modem, condenser microphone, IrDA-compliant infrared port

the bundle

None

real world battery life

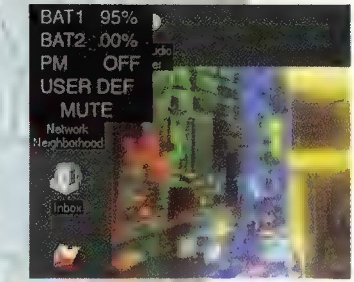
02:04:00

the goods

We just weren't impressed with the WinBook FX. The video performance is unacceptable, and its standard features, price point, and nonexistent software bundle are easily bested by the competition.

Beauty is Only Skin Deep

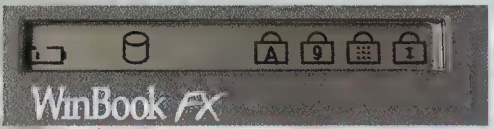
The WinBook FX's vibrant, 12.1-inch active matrix display is one of its best features (off-axis viewing is especially impressive). Unfortunately, the Cirrus Logic GD7543 video chipset and 1MB DRAM delivered exceptionally poor Windows and DOS performance (full-screen, software-decoded MPEG-1 playback was pathetic).



BAT1 95%
BAT2 00%
PM OFF
USER DEF
MUTE

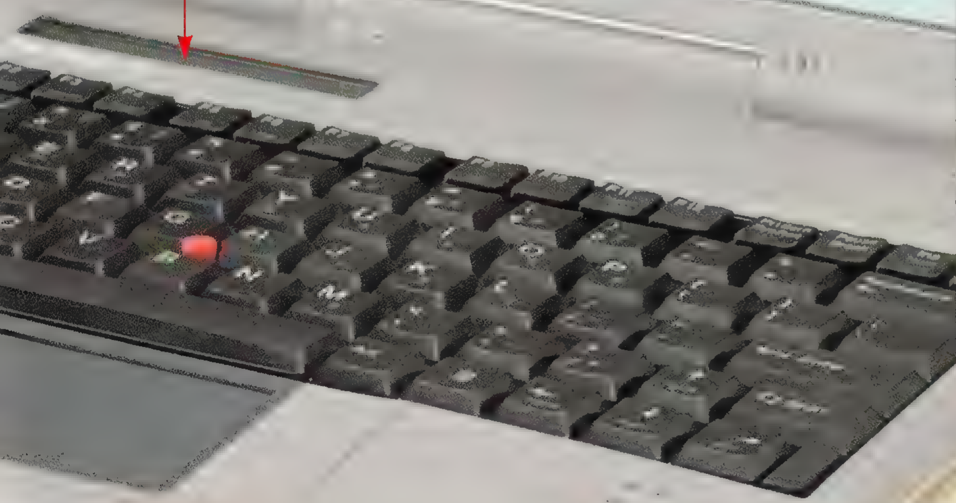
Poppin' Fresh

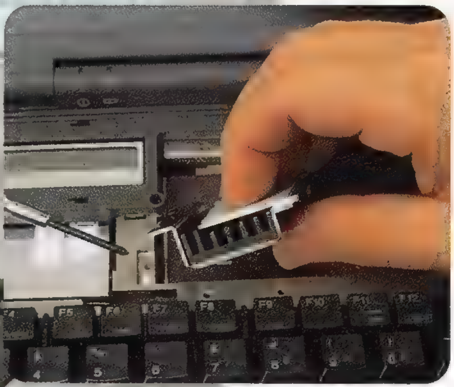
The WinBook FX features a cool pop-up Status window (activated by hitting the <FN> + <F2> keys) to monitor the charge for the primary and secondary batteries. You can also check the power management and speaker-mute status.



Lock, Stock, and Barrel

The status LCD displays primary and secondary battery gauges, Caps Lock, Num Lock, and Scroll Lock conditions.





Ridge Racer

We popped off the top panel to check out the WinBook FX's heat sink. In this space-saving, ridge-style design, the Pentium is cooled by air that's pulled across the ridges and then up and out through a mesh in the top panel.

Key Lime Pie

The brightness, audio, and power management features are all controlled by a combination of keyboard commands. You can adjust the audio balance, bass, volume, and treble levels too—welcome features not usually found in a notebook. The keyboard has terrific tactile response, and the presence of both a track pad and a pointing stick make desktop navigation easy as pie.

+	—
• TERRIFIC DISPLAY (ESPECIALLY OFF-AXIS) • BOTH A TRACK PAD AND A POINTING STICK BUILT IN • 2GB HARD DRIVE • DEDICATED GAME PORT • GOOD POWER MANAGEMENT	• SUB-PAR VIDEO PERFORMANCE • NO SUPPORT FOR ZOOMED VIDEO PORT TECHNOLOGY • BAD SPEAKER PLACEMENT

boot verdict

PRICE: $3,999 as reviewed (pricing and features vary)

COMPANY: WinBook
PHONE: 800.468.7502
URL: www.winbook.com

4

Longbow: Flashpoint Korea

Once more into the breach

The only complaint gamers had about Jane's *AH-64D Longbow* helicopter simulator was that there wasn't enough of it. The sim's near-perfect blend of realism, action, and playability was limited to only one campaign.

Well, get ready for this Korean campaign to test your metal with enough missions and threats to keep you in the cockpit for weeks. All coming at you in 256 colors at 640x480.

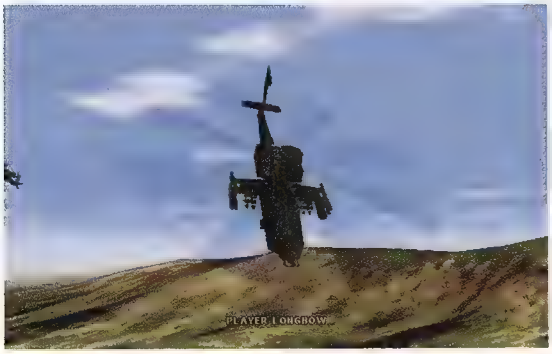
Flashpoint Korea is more than a mere add-on campaign. Instead, it upgrades the game itself, including new weapons, avionics models, coordinated battlefield targeting, digital audio, and much smarter opposing forces. The same tactics and techniques that earned you promotions and honors in the original game still work here—you just have to be better at them. Enemy units will move to hide from your attacks and defend themselves, even call in air or artillery support.

Ever wonder how the action looks from the front seat? *Flashpoint Korea* lets you fly as pilot or in the new co-pilot/gunner seat. Any mission can be flown from either seat, adding replay value.

The campaign is made up of more than 40 missions set in steeper terrain, and you can fly more than 100 other stand-alone missions. And again, you'll receive newscasts keeping you updated on the war's progress.

Of course, you'll need the original *AH-64D Longbow* to play this add-on, but this is one sim you want to own, and the new campaign just adds to the excitement.

— Lee Buchanan

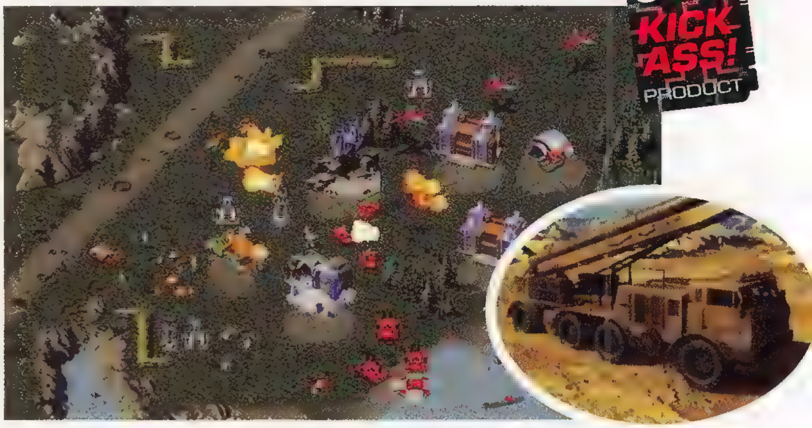


Enhanced avionics and more white-knuckled missions await you in *Flashpoint Korea*.

boot verdict

PRICE: $29.95
COMPANY: Origin/EA
PHONE: 800.245.4525
URL: www.ea.com/janes

8



In *Red Alert*, history is altered and it's the Russians who march across Europe.

Command & Conquer: Red Alert

The evil that men do

Red Alert is the sequel to *Command & Conquer*, but its parallel universe storyline is just as compelling. Albert Einstein has changed the course of history by going back in time and killing Adolf Hitler. As a result, Hitler never invades Europe, and the Russians (under Joseph Stalin), march across the continent. The Cold War isn't over, just defrosted.

While based on the *C & C* game engine, *Red Alert* boasts far superior AI and SVGA graphics. The computer now builds and maintains its own bases, as opposed to the original *C & C*'s premade bases. Your computer opponent has also grown battle savvy. For example, in the original game, if a tank came across a barrier it would immediately look for a new route. In *Red Alert*, the tank tries to blast through the barrier, and only looks for a new route as a last resort.

There are 40 missions to conquer and 20 multiplayer maps (with head-to-head Internet support for up to eight players). Gameplay can be tough, due to your limited ore-mining resources and military strength. To win this war, you'll be required to solve mission-related puzzles, and manage your troops effectively. Missions in *Red Alert* are more strategically designed; poor planning early on can have major implications in subsequent missions.

Red Alert features a bevy of new units to command. Playing as the Allies, you'll command AT mine layers, Jeeps, cruisers, gunboats, GPS satellites, medics, and spies. As the Soviets, you'll have access to vicious attack dogs, V2 rocket launchers, submarines, YAK fighters, paratroopers, and spy planes.

Red Alert is a feast for the senses, taking advantage of Microsoft's DirectX. Played on systems as low as a P90, the game runs at 15fps in 256 colors at 640x480. The game's superb digital audio will keep troop morale high. Play the Soviet side and a spy with Sean Connery's distinct brogue will bellow "For king and country!" when he blows up your base.

The cinematics are a captivating mix of FMV and 3D animation rendered in *3D Studio Max* that bring home the brutality of war (the image of a teddy bear falling from a slain child's hand is especially disturbing).

Red Alert isn't a huge leap in originality over its predecessor. But like the original classic, it is utterly engrossing.

— Brad Craig

boot verdict

PRICE: $49.95
COMPANY: Virgin Interactive
PHONE: 800.874.4607
URL: www.westwood.com

9

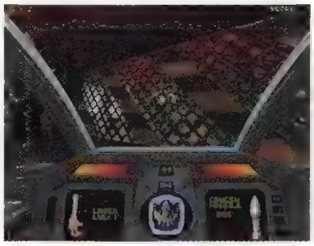
H/W

ViRGE/VX

Half empty

The Diamond Stealth 3D 3000 XL and STB's Velocity 3D are both 64-bit 2D/3D graphics cards utilizing S3's newest video chip—the ViRGE/VX. But the mixed bag of 2D and 3D performance is either half full or half empty, depending on what types of applications you'll be running.

The ViRGE/VX is an all-purpose chip intended to deliver high performance 2D and 3D acceleration in Windows, complete with texture mapping, and legacy support for DOS applications. The ViRGE/VX chip, like its predecessor, also supports flat and Gouraud shading, bilinear and trilinear filtering, mip mapping, depth cueing, fogging, alpha blending, Z-buffering, and perspective correction. Technological improvements include an integrated 200MHz RAMDAC and clock synthesizer (the regular ViRGE had a 135MHz RAMDAC). This translates into a maximum resolution of 1600x1200 with 16 million colors at 75Hz (provided that you're running with 8MB of VRAM). Both Diamond's and STB's cards come equipped with a hearty 4MB of dual-ported EDO VRAM, but only the Velocity 3D can make the jump to 8MB.



Where the rubber meets the road, both ViRGE/VX cards provide superior 2D acceleration in Windows. In fact, substantially better performance than the slate of Vérité-based cards reviewed in boot 04. Unfortunately, 3D performance was less than stellar. For example, the 3Dfx produced 50fps in accelerated Descent II, *while the ViRGE/VX chip could only manage 16fps. And in both* Hellbender *and* Descent II *the speed and fluidity were marred by grainy textures.*

Currently, games accelerated for the original ViRGE won't work on the ViRGE/VX. At press time the problem was still unresolved, but S3 promised a fix soon. VESA 2.0 isn't supported in hardware, so you'll need to download the latest UniVBE 2.0 drivers from S3's web site (and SciTech's Display Doctor *wouldn't work on either card). Drivers for Win95, NT 4.0, and most major operating systems are included, and Direct 3D is supported.*

The ViRGE/VX lacks Y-interpolation but it is color-depth independent. Full-screen MPEG playback (at 640x480) looks good, but bump up the resolution to 1024x768 or beyond, and video performance and quality degrade dramatically, including pixelation, flicker, and noise. (S3 claims their next incarnations, the ViRGE/DX and GX, will improve MPEG performance, adding horizontal and vertical interpolation.)

If you're more interested in applications requiring a higher resolution and color depth, then ViRGE/VX-equipped cards are amply suited for the task. But if you're a serious gamer looking for ultimate 3D performance, ViRGE/VX isn't your solution. Diamond recommends using their Monster 3D in conjunction with a Stealth 3D 2000 for ultimate gaming satisfaction.

— Bryan Del Rizzo

ViRGE/VX Showdown

	DIAMOND	STB
Graphics WinMark (in million pixels per second)		
800x600 24 bit 75Hz	29.8	30.8
1024x768 16 bit 75Hz	34.8	36
1280x1024 8 bit 60Hz	37.3	43.3
Descent II (unaccelerated) (fps)		
640x480	21.4	22.8
800x600	12.7	13.7
Descent II (accelerated) (fps)		
640x480	16	16
Quake (unaccelerated) (fps)		
640x480	11.7	11.7
800x600	9.0	9.0
1024x768	6.2	6.2

Diamond Stealth 3D 3000 XL

It's priced higher than the Velocity 3D, but the Stealth 3D 3000 XL comes with a hearty bundle.

While slightly slower than STB's offering, the Stealth 3D didn't feel noticeably slower in any of the applications we tested it with. You wouldn't want to base your decision between the two on performance alone.

Like the Velocity 3D, the Stealth 3D 3000 XL includes a control panel for on-the-fly screen resolution, virtual desktops, and monitor centering.

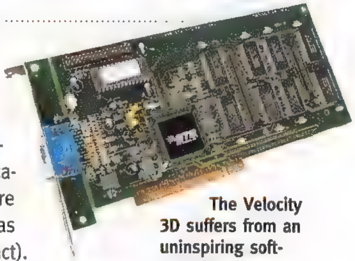
The Stealth 3D comes with considerably more software than the Velocity 3D, including a limited edition of *Descent II* and *Compton's Interactive Encyclopedia 1996.* Also bundled is Asymetrix's *Digital Video Producer,* a video capture and editing program with audio, titling, and 3D effects features; and *3D F/X,* an impressive accelerated program, which produces 3D graphics and animation with relative ease. A software MPEG player is also included.

But these riches come at a price. The Stealth 3D 3000 XL costs considerably more than the Velocity 3D. While the stock 4MB version is $299 (compared to $249 for STB's 4MB card), if you were to buy the 2MB version of Diamond's card and upgrade it to 4MB, it would run you $398. In comparison, the Velocity 3D with 8MB is $50 *less,* at only $349.

boot verdict

PRICE: $249 with 2MB; $299 with 4MB
COMPANY: Diamond Multimedia
PHONE: 800.468.5846
URL: www.diamondmm.com

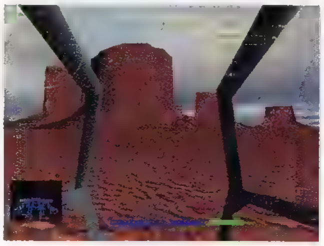
STB Velocity 3D



The Velocity 3D suffers from an uninspiring software bundle.

Overall, the Velocity 3D was faster than the Stealth 3D 3000 XL by as many as 6 million pixels per second (at 1280x1024, 8-bit color depth) during Windows 2D application tests. Although *Quake* frame rates were identical on both cards, the Velocity 3D was slightly faster in *Descent II* (2fps to be exact).

The STB Vision control panel is activated when you boot into Win95 (we recommend manually adding it to the taskbar), and allows you to adjust a bevy of parameters including screen resolution, monitor selection, and image centering. You can dynamically change the screen resolution or the size of the desktop without rebooting, and you can create settings for different Windows applications.



STB's software bundle is disappointing, and includes only one game—a ViRGE/VX edition of *MechWarrior 2,* which wasn't available for review. An MPEG software player and *Colorific,* a color matching app for monitors and printers, are also included in the package.

Still, with the ability to upgrade to 8MB, and solid DOS and Windows performance, the Velocity 3D is a good choice for those who crave monster res and depth in Windows.

boot verdict

PRICE: $249 with 4MB (reviewed); $349 with 8MB
COMPANY: STB Systems
PHONE: 972.234.8750
URL: www.stb.com

H/W

Multimedia Speakers for Digital Audiophiles

Aural climax or melodic cold shower?

If you need to *feel* the detonation of grenades rending zombies asunder, then chuck the crappy speakers that came with your system and get yourself some real boom.

It don't mean squat if you're armed with an AWE64 or Roland SCC-1 if they are played through lackluster speakers. You need real speakers.

The latest in PC speaker technology threatens to drown you in a sea of technological terminology, all geared at creating the illusion of proper sound staging (Dolby Surround *this*, Q-Sound *that*). Creating total audio immersion is considered the holiest of all quests and many sally forth, hoping to bring home the elusive treasure.

Some will fail... others will triumph.

— Andrew Sanchez

Altec Lansing ACS45 PowerCube

Size doesn't matter, it's how you work it

boot KICK ASS! PRODUCT

From the thunderous explosions in your favorite game to the pumpin' bass in your favorite audio CD, Altec Lansing's three-piece ACS45 speaker system packs some serious aural firepower.

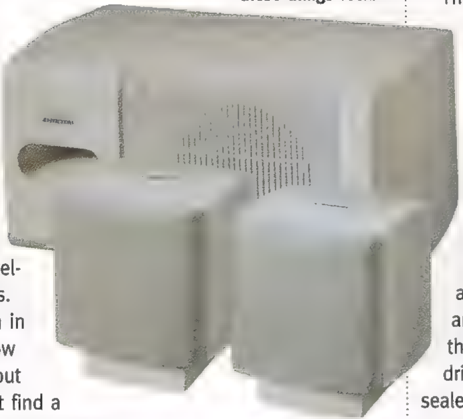
The two satellite speakers consist of three-inch paper cones housed in magnetically-shielded, acoustically-inert plastic cubes that require minimal desktop real estate. A small amp drives these puppies, with six watts of power each, but they sound much bigger in a near-field listening environment.

The subwoofer is encased in a tune-ported, bass-reflex enclosure. This box delivers the low-end goods with a four-inch, long-throw driver powered by a 20-watt amp.

An electronic volume control on one of the satellite speakers cranks all three speakers. And if you're the type who likes to leave your system running all the time, an electricity-saving switch automatically shuts the system down if it doesn't detect an input signal for an extended period of time.

Specs are interesting, but what makes these speakers impressive is the way they sound. The sub kicks out room-shaking bass, while the three-inch satellites deliver crystal-clear highs. The sub doesn't deliver much in the subterranean depths below 40Hz, and the satellites top out relatively early, but you won't find a better set of speakers in this price range.

Don't be fooled by the price—these things rock.



boot verdict

9

PRICE: $99
COMPANY: Altec Lansing
PHONE: 800.648.6663
URL: www.altecmm.com

Aiwa SC-C37 Active Speaker System

Definitely smaller than a breadbox

Small enough to fit almost anywhere, but where's my DC adapter?

These days, cutting-edge notebook PCs come equipped with just about every multimedia whistle and bell you can think of. Unfortunately the speakers in most of the systems we've seen pretty much blow. But once you plug Aiwa's SC-C37s in your mobile monster, you'll never hit the road without 'em.

These mighty mites measure a mere three-inches square, and they're just slightly more than one inch deep. Two-inch drivers are securely nestled in sealed black enclosures behind protective steel-mesh grilles. The speakers snap together for easy storage and carrying; the left speaker even provides a corral for the cables.

The speakers deliver clean midrange and high frequencies, but hardcore bass addicts will need to find their fix elsewhere. CD audio was remarkably clean, and game soundtracks delivered the kind of punch that always seems to be missing from the girlie-man speakers found in most notebooks.

With a price tag of less than $40, the SC-C37s are a virtual no-risk proposition. If you own a portable PC, give these speakers a shot. You won't regret it.

boot verdict

7

PRICE: $39.95
COMPANY: Aiwa
PHONE: 800.289.2492
URL: www.aiwa.com

Altec Lansing ACS55 PowerGaming Speaker System

Caution: Dangerous curves ahead

Altec Lansing wants to seduce your eyes and ears with its ACS55 PowerGaming speaker system. One out of two ain't bad.

Each curvy, ebony cabinet houses a half-inch dome tweeter and two three-inch full-range drivers; one of which is mounted 90° off-axis to provide dispersion for the built-in Dolby Pro-Logic surround-sound decoder. The bass-reflex subwoofer contains a separate 40-watt amp and a 6.5-inch long-throw paper-cone woofer.

The Dolby circuitry provides a wider, more immersive sound stage, and the adjustable center-channel delivers solid center-stage imaging without requiring a separate speaker. Game soundtracks must be specifically encoded with Dolby Pro-Logic in order to take full advantage of this feature; a relative rarity. (*Wing Commander IV* and *F-22 Lightning II* are notable examples that sound great on this system.) You can turn off the Dolby when you're listening to audio CDs.

In the end, however, Altec promises a multimedia mountain, but winds up delivering a musical molehill. At 200Hz, the subwoofer's crossover point is very high—and you can't adjust it lower. This translates into unimpressive low-end response, with the sub bottoming out during in-depth listening sessions with bass-heavy tracks. The tweeters delivered crystal-clear highs, but getting acceptable midrange response required a lot of tweaking.

Altec Lansing bundles its *Wave-CUBE 4.0* wavetable-synth software (developed by Ensoniq), but this algorithm's performance is roughly equivalent to Yamaha's OPL3-3SA chip—only owners of substandard sound cards will be interested.

Beauty is only skin deep, especially with the ACS55. They may look cool, but all it really amounts to is posturing.

Seven drivers make for Dolby Surround Sound nirvana... if you can get your settings straight.

boot verdict

PRICE: $199
COMPANY: Altec Lansing
PHONE: 800.648.6663
URL: www.altecmm.com

6

* * *

Not even the magic of Q-Sound can save these speakers from themselves.

Aiwa TS-CD40

The sound of one hand clapping

Sweet sonic seduction becomes a dreary dissonant dirge with Aiwa's TS-CD40 3-piece speaker system. Considering the system's price, you'd expect the London Philharmonic of multimedia to fill your room—what you get is a one-man band trying to play a tuba filled with mayonnaise.

The TS-CD40 has a 30-watt 4-inch subwoofer in a massive bass-reflex enclosure and is supported by Aiwa's SC-C57 three-inch speakers packing 5 watts, and the entire system includes Q-Sound circuitry for "enhanced" spatial immersion (a simple on/off switch, but no control on the amount of enhancement). All system controls are located on the right speaker (no remote subwoofer control, unfortunately), while the satellite speakers are cleverly aimed toward the center for proper imaging.

The SC-C57 satellites responsible for reproducing the broad midrange frequency band sound artificial, lacking richness or spaciousness. Engaging Q-Sound turned them into a bloated cacophony of muddled sloppy midrange reproduction, drowning out any imaging or linearity the speakers had—Clair Marlo's silky vocals sounded as if she was singing through a megaphone.

The subwoofer is a real disappointment—amorphous thumps with no solid definition, lacking the punch and control other subwoofers dutifully deliver. The entire speaker system suffers from underpowering, as the 5-watt satellites crackled and strained playing intense passages such as Strauss' *Also Sprach Zarathustra* and Pink Floyd's *Dark Side of the Moon*. *Quake*'s thunderous explosions and in-human Ogre growls became mundane mush and pitifully muffled grunts—not pretty.

The Aiwa TS-CD40 tries valiantly to deliver—unfortunately the only thing you get is mushy melodies and ho-hum bass.

boot verdict

PRICE: $249.95
COMPANY: Aiwa
PHONE: 800.289.2492
URL: www.aiwa.com

3

H/W

Smart Video Recorder III

I'm ready for my digitization, Mistah DeMille

Crystal clear 640x480 single frame grabs are hard to get, but when you snag 'em, they're gorgeous.

Between the frame-grabbing fun of Play's Snappy and the FMV muscularity of Miro's DC30 (both reviewed in *boot* 05) lies Intel's video capture card. The Smart Video Recorder III is your ticket to capture rapture.

The Smart Video Recorder III (ISVR III) heralds Intel's return to capture cards after their original ISA-bound multichip ISVR Pro. Now a PCI-based single-chip solution providing S-Video and RCA Composite input only (no built-in audio input jacks—a sound card is required for audio recording), the ISVR III approaches real-time video capture backward, capturing and unloading practically all the real-time encoding onto your Pentium processor. Simply put, if you have a screaming P200 MMX with at least 32MB of RAM and a fat hard drive interfaced to a speedy I/O card (a *must* for video capturing and processing), the ISVR III delivers bold, beautiful video at 640x480. Any fewer ponies, and capture performance suffers big time. Compression is accomplished via software, enabling the ISVR III to utilize future video codecs.

A painless installation in our P166 test system, armed with 16MB of RAM, translated into equally impressive results. The ISVR III captured 2,000 frames of 320x240 at 30fps in YUV9 format (no recompression) without dropping a single frame. At 400x300, the system began to drop frames (roughly 34 percent), while 640x480 dropped 60 percent. Once you're happy with the raw video, pipe it into any video post-production software (the ISVR III ships with Asymetrix's *Digital Video Producer 4*), and compress to your heart's content. Two capture techniques (a faster real-time capture and compression; as well as a slower, but more effective, off-line compression), and a variety of codecs to compress with (Indeo, Cinepak, QuickTime, Video For Windows, Kinetix's FLC/FLI) make for almost boundless video quality and playback possibilities.

The quality of 640x480 single-frame still captures varied wildly, from crystal clear to streaky and jagged. Still, all the 320x240 captures we generated were solid.

While overall performance leans heavily on your system's horsepower, the Smart Video Recorder III's combination of stellar video capture and competitive price cannot be beat.

— *Andrew Sanchez*

boot verdict

PRICE: $199
COMPANY: Intel Corporation
PHONE: 800.628.8686
URL: www.intel.com

8

S/W

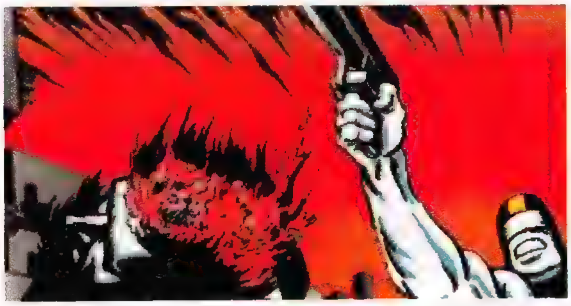
ZPC

Zero Play Caliber

Try it out! demo on the bootDisc

Ever wonder why the ads for some games never show sceen shots of the gameplay? Load *ZPC* on your machine and you'll wonder no more. The game producers at Zombie have taken the awesome talent of MTV animator Aiden Hughes and flushed it right down the toilet.

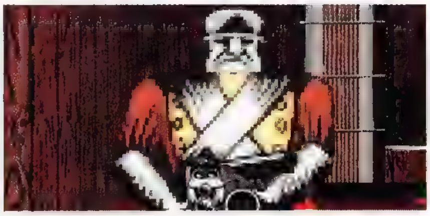
ZPC traps Hughes' industrial-style illustrations in the wretched *Marathon 2* first-person action game engine, which Zombie has licensed from Bungie. Characters move so stiffly, they look as though they were allocated just two or three frames of animation each. And there's no sense of physics in the game. Fall from a ledge and you float to the ground with no injuries.



Scenes such as this come close to delivering the quality animation that fans of animator Aiden Hughes will expect from this game. Unfortunately, that quality appears only in the briefest of cut scenes.

All the texture maps—even the gauges on the droning machinery—are dull, repeating tiles, rendered in subdued, washed-out earth tones.

The game does have a few saving graces. The musical score, by Roland Barker (Revolting Cocks) and Paul Barker (Ministry) is perfectly suited to the plot, in which you play a messiah leading the revolt against a totalitarian regime. As the action heats up, the tracks change from ambient synth beds to Eastern Bloc-style marches. The 16-bit digital audio automatically pans as you turn around and move through the game maze, adding atmospheric ambiance. The sound effects, on the other hand, are a big disappointment: flat and unimaginative.



***ZPC*'s storm troopers were inspired by Nazi soldiers, but they're so pixelated that it's difficult to tell.**

You can't interact with any of the characters—not even the followers who grovel at your feet—other than to kill them. They babble in an unidentifiable language, and their comments such as "Do you have authorization?" are translated for you in subtitles. You, on the other hand, are mute, even in the eight-player network mode.

The worst part about this dreadful game is that it might discourage other artists and musicians from participating in the development of new games—and that's a damn shame.

— *Michael Brown*

boot verdict

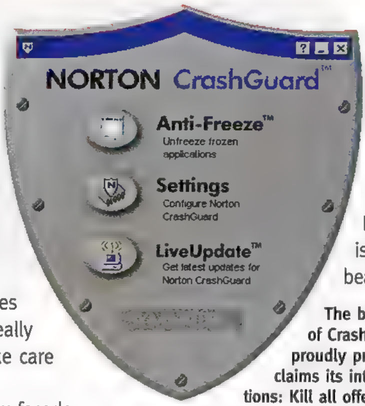
PRICE: $49.95
COMPANY: GT Interactive/Zombie
PHONE: 212.726.6500
URL: www.gtinteractive.com

3

Try it out! demo on the bootDisc

Norton Utilities 2.0

Holden Caulfield would be proud

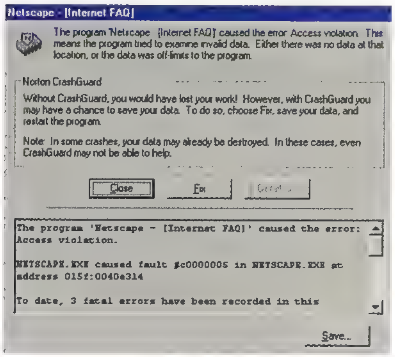

NORTON CrashGuard™
Anti-Freeze™
Unfreeze frozen applications
Settings
Configure Norton CrashGuard
LiveUpdate™
Get latest updates for Norton CrashGuard

The badge of CrashGuard proudly proclaims its intentions: Kill all offending crashes.

Rooting out evil and corruption like a masked vigilante comes *Norton Utilities 2.0*, ready to lend a sorely-needed hand in the Win95 world of inconsistent device drivers, corrupted registries, and unplanned system crashes. But does the latest incarnation really have the cajones to take care of business?

Beneath its slick new facade, improved or enhanced versions of all the award winning system utilities rumble (including a faster disk optimizer, OSR-2/FAT-32 readiness, and a smarter System Doctor that monitors newer IDE drives and warns you of possible physical failure). And *Norton Utilities 2.0* has several new additions to its bag-o-tricks. LiveUpdate acts as personal trainer, finding, downloading, and automatically installing new Symantec patches and updates via a single mouse click to their FTP site. While other Internet-related enhancements abound (a speedometer that tells you how fast sites are responding), *Norton 2.0* sports more notable additions.

System Genie is *not* the sequel to Disney's *Aladdin*—it's a Win95 magi, ready to grant Win95 customization wishes with a simple point-and-click interface. For the roll-up-your-sleeves types who practice exploratory surgery on the System Registry, Norton's Registry Tools suite can't be beat, complete with a much-enhanced Registry Editor, Tracker, and Advisor to hack you through the Registry jungle.



The program 'Netscape - [Internet FAQ]' caused the error Access violation. This means the program tried to examine invalid data. Either there was no data at that location, or the data was off-limits to the program.

Norton CrashGuard

Without CrashGuard, you would have lost your work! However, with CrashGuard you may have a chance to save your data. To do so, choose Fix, save your data, and restart the program.

Note: In some crashes, your data may already be destroyed. In these cases, even CrashGuard may not be able to help.

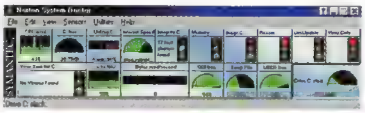
```
The program 'Netscape - [Internet FAQ]' caused the error:
Access violation.

NETSCAPE.EXE caused fault $c0000005 in NETSCAPE.EXE at
address 015f:0040e314

To date, 3 fatal errors have been recorded in this
```

Here it comes to save the daaay! *Norton Utilities 2.0*'s CrashGuard swoops in to intercept a pesky *Netscape* crash. What nerve!!!

But, one of the biggest additions to *Norton Utilities 2.0* is CrashGuard with AntiFreeze. Acting as judge, jury, and executioner to would-be 16-bit and 32-bit crashes (access violations, float overflow, etc.), CrashGuard steps in when the guano hits the fan, warning you of the program error occurring, at which point you can 'fix' the problem (ie. safely exit the program, saving any data along the way). Under real-world conditions, it was able to pull my crash-induced fat out of the fryer about 60 percent of the time. While CrashGuard apprehended *Navigator 3.0*'s access violations error faster than greased lightning, *Eudora* turned out to be the fox in the hen house—freezing all applications and rendering my PC useless... not even AntiFreeze could unlock my frozen program and save me from the three-finger salute.



Customize your System Doctor's appearance to help match those lovely Microsoft motifs.

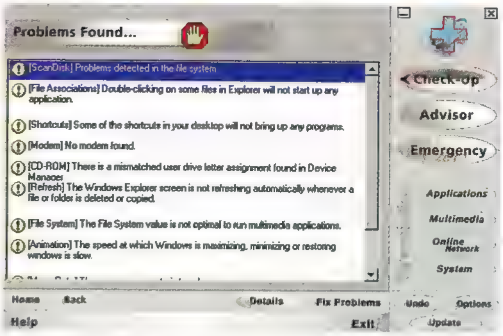
Norton Utilities 2.0 is a must. While its impressive array of system-maintenance utilities are welcome, don't expect miracles with CrashGuard or AntiFreeze.

— *Andrew Sanchez*

boot verdict

PRICE: $79
COMPANY: Symantec
PHONE: 800.441.7234
URL: www.symantec.com

8



[ScanDisk] Problems detected in the file system
[File Associations] Double-clicking on some files in Explorer will not start up any application.
[Shortcuts] Some of the shortcuts in your desktop will not bring up any programs.
[Modem] No modem found.
[CD-ROM] There is a mismatched user drive letter assignment found in Device Manager
[Refresh] The Windows Explorer screen is not refreshing automatically whenever a file or folder is deleted or copied.
[File System] The File System value is not optimal to run multimedia applications.
[Animation] The speed at which Windows is maximizing, minimizing or restoring windows is slow.

***First Aid 97* will give your PC a thorough physical.**

First Aid 97

Get me a medic!!!

First Aid 97 is like trying to stop arterial bleeding with a Band-Aid—it has the right intentions, but it's not big enough to staunch the flow.

Win95's triage of corrupted registries, incorrect uninstalls, and conflicting drivers demand serious attention. *First Aid 97* won't commit malpractice, but other, more feature-enriched packages do what *First Aid 97* claims to do... *and* more.

CyberMedia's Win97-compatible utility suites set out to protect and serve your computer, including their version of a system watchdog (Crash Protector), their Anti-Freeze agent (Computer Program Reactivator), as well as the usual system-friendly advisors, and system health gurus. Noteworthy utilities include Advisor, which helps troubleshoot problematic areas such as sound cards and speakers. While Dr. Solomon's Anti-Virus is included, the lack of a disk optimizer, registry editor, and other essential tools hamper *First Aid 97*'s usefulness. The tools that *are* included hide behind cutesy medical metaphors, making the hunt for the right utilities a chore.

Oil Change is CyberMedia's answer to Norton's LiveUpdate. And, in this case, Oil Change runs circles around LiveUpdate, finding and downloading updates and patches for *all* the hardware and software installed on your system (unlike LiveUpdate, which only updates Symantec products).

Crash Protector, like Norton's CrashGuard, would like you to think it can save your world, but reality has an odd habit of proving such intentions wrong. While Crash Protector successfully intercepted an Explorer error, *Eudora* froze my system and there was nothing Crash Protector or CPR could do to save the day.

First Aid 97 may be useful for novices afraid of prodding inside their operating system, but *Norton Utilities 2.0* packs more performance punch.

— *Andrew Sanchez*

boot verdict

PRICE: $39.99
COMPANY: CyberMedia
PHONE: 800.529.2373
URL: www.cybermedia.com

5

S/W

System Commander 3.0

Gross hack makes good

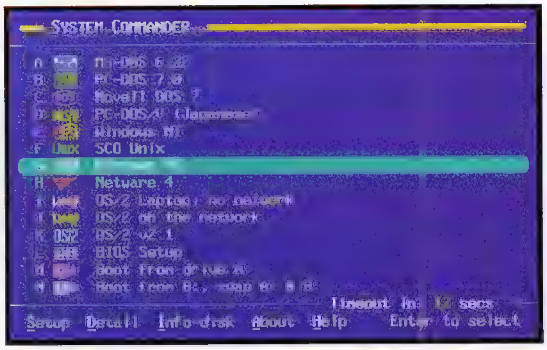
It's a dirty job. Trying to get multiple operating systems to exist on one machine without them walking all over each other is a real headache. The bonehead disk partitioning and file system limitations left from the PC's birth only make matters worse. The system architecture was never really intended to support separate but equal OS's, and many OS's (particularly Microsoft's) were never intended to share a machine. It's a gross situation, and only a gross hack such as *System Commander* can save the day. It does, and does it as well as it can be done.

By overwriting the master boot record on your hard disk, *System Commander* takes control of your machine when you boot up. You then decide which operating system installed on your machine you want to boot from, and once you make your choice, *System Commander* shuffles configuration files, hides partitions, and gets out of the way; leaving no trace in memory as your selected OS boots. You can install OS's into their own partitions, or if the OS's support FAT, several can share a single FAT partition. *System Commander* keeps them out of each other's hair, tracks changes to configurations, and logs new operating system installs. *System Commander* can also be configured with account names and passwords, limiting who has access to particular drives and setups.

Most of the problems with *System Commander* turn out to be beyond the software's control. For example, installing Win95 will overwrite the MBR block on the hard disk where *System Commander* resides, forcing you to reinstall the utility. The comprehensive manual goes into great depth explaining the idiosyncrasies of many common OS's and how to work around them, but this can be confusing stuff. The manual would benefit from being more thorough.

Messing around with the partitions and boot blocks on you hard disk is not for the fainthearted, and frequent backups are a *must*. But if you've got the need, this is the tool to make it as painless as possible.

— *Chris Dunphy*



System Commander lets you boot into as many as 100 operating systems and configurations.

boot verdict

PRICE: $99
COMPANY: V Communications
PHONE: 408.296.4224
URL: www.v-com.com

8

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S/W

boot KICK ASS! PRODUCT

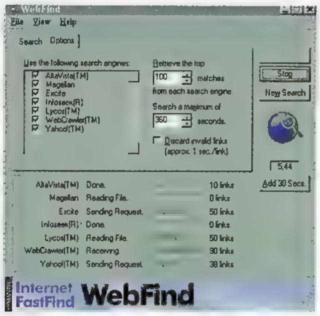
Try it out! demo on the bootDisc

Internet FastFind

Don't go online without it

Sure it's fast, but *Internet FastFind*'s real forte is its versatility.

At the core of this suite of Internet utilities is the WebFind program that queries the seven major search engines simultaneously, weeding out redundant listings and dead links. Results are presented in a conveniently organized local HTML document that can be sorted by page or, better yet, by site. While you can set the maximum number of matches returned and the duration of the search, even with a maximum of 100 matches per engine, the cumulative time rarely exceeds a minute.



Use the following search engines:
☑ AltaVista(TM)
☑ Magellan
☑ Excite
☑ Infoseek(R)
☑ Lycos(TM)
☑ WebCrawler(TM)
☑ Yahoo!(TM)

Retrieve the top 100 matches from each search engine.
Search a maximum of 360 seconds.
☐ Discard invalid links (approx. 1 sec./link)
5:44

```
AltaVista(TM)  Done.              10 links
Magellan       Reading File.      0 links
Excite         Sending Request.   50 links
Infoseek(R)    Done.              0 links
Lycos(TM)      Reading File.      50 links
WebCrawler(TM) Receiving          90 links
Yahoo!(TM)     Sending Request.   38 links
```

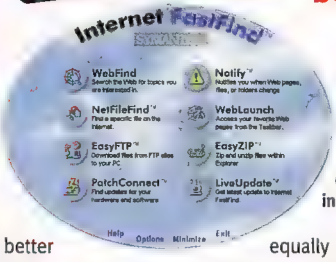
You can monitor the progress of a WebFind search in progress.

And a WebFind button installs automatically at the top of your browser for easy access on the fly.

Alongside the WebFind button in your browser, *FastFind* installs a Notify button that allows you to set the utility of the same name. Basically, this handy tool keeps an eye on your favorite sites, checking at user-defined intervals, and the icon installed in the taskbar blinks when any of the sites you've marked are changed. This is great for keeping up with the latest uploads to a shareware/demo site. With a dedicated line and hourly checks, you can rest assured you are connected. The only thing better would be if Notify could take you right to the new additions.

Next to the Notify icon in the taskbar is the WebLaunch button, which automatically launches your browser and takes you straight to the bookmarked site you select from its pop-up menu.

EasyFTP gives all the FTP sites you visit a familiar Explorer interface, allowing you to tab frequently visited sites and download files by just dragging and dropping them to your hard drive. NetFileFind allows equally simple file transfers based on a worldwide search performed by the utility.



WebFind Search the Web for topics you are interested in.
Notify™ Notifies you when Web pages, files, or folders change
NetFileFind™ Find a specific file on the Internet.
WebLaunch Access your favorite Web pages from the Taskbar.
EasyFTP™ Download files from FTP sites to your PC.
EasyZIP™ Zip and unzip files within Explorer
PatchConnect™ Find updates for your hardware and software
LiveUpdate™ Get latest update to Internet FastFind.

***Internet FastFind*'s floating round window leads you to the eight excellent tools in the suite.**

EasyZIP melds with Explorer to make the line between compressed and uncompressed files seamless. And other utilities in the package scout out updates for your hardware and software based on a system scan.

The Internet can be a real jungle and *FastFind* will help you cut your way through the growth faster than a machete.

— *Brad Dosland*

boot verdict

PRICE: $49.95
COMPANY: Symantec
PHONE: 800.765.7839
URL: www.symantec.com

9

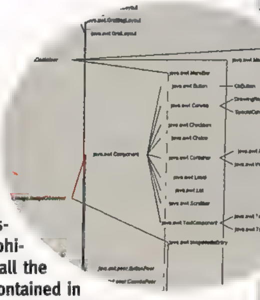
Java Café

Just what the doctor ordered

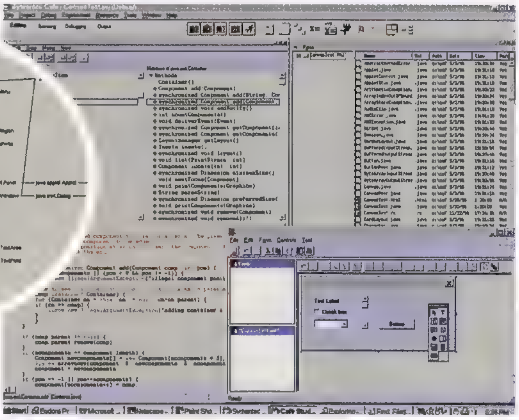
So, you're daydreaming of amazingly cool Java content, but figure it's a hassle to create. An evening with Symantec's *Java Café* will convince you otherwise.

Actually, Java experts will love *Café* as much as novices. Almost every feature we've come to expect from high-end project-oriented tools is included here, as well as a few you probably haven't seen before.

Everything you'll need to create whiz-bang Java content is included. Get yourself oriented with the ProjectExpress feature, which takes you from zero to basic applet in less than a minute. Name your project and its location on your hard drive, and *Café* creates a starter set of files including Java source, a resource file, and a bare-bones HTML document that embeds your applet. At this point, use Café Studio to lay out whatever menus, buttons, GIFs and such you want in your applet; the corresponding Java source is dynamically created and maintained as you edit. When you're ready to run your applet, *Café*'s built-in Applet Viewer makes it practically painless; no fussing with a separate browser necessary. By the way, it is just as easy to create stand-alone Java applications, which *Café* can run with its super-fast Java VM (Virtual Machine).



Java Café's Hierarchy Editor displays a graphical view of all the classes contained in the current project, including the Java class libraries. The two-way features of the Hierarchy Editor let you visually modify the hierarchy by dragging inheritance lines with the mouse.



Café IDE showing a default AppExpress-generated application loaded in the project view, with the hierarchy and class methods displayed and a custom form under design in Café Studio.

The text editor and debugger are impressively flexible and rich. Especially powerful is the Hierarchy Editor, which makes for quick navigation and rearrangement of both your own Java classes and those you import. There's no better way to understand what's going on under the hood than browsing Sun's Java class library, and *Café* makes it extremely easy.

Our prescription: Make two applets and call us in the morning. Java makes you feel good, and Symantec's *Café* relieves the headaches of Java development.

— *Neil Redding*

boot verdict

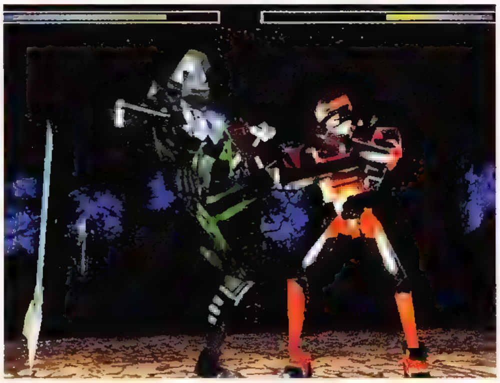
PRICE: $129.95
COMPANY: Symantec
PHONE: 800.441.7234
URL: www.symantec.com

8

Try it out!
demo
on the
bootDisc

CyberGladiators

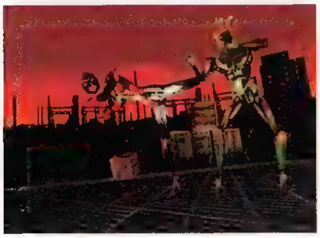
There can be only one



Nothing beats a good kick in the gut to help loosen your cybernetic bolts.

CyberGladiators is, simply put, one of the most impressive PC fighting games ever.

Abandoning 2D sprites, *CyberGladiators'* protagonists are light sourced, texture mapped polygon models, albeit low polygon-count ones. This results in some rather square looking fighters. But hey! They're supposed to be robots, right? Don't doubt *CyberGladiators'* graphical prowess—while it may not compete with *Tekken 2* on the PSX or *Virtua Fighter 3* in the arcades, it easily grinds *FX Fighter* into a pulp, and gives *Virtua Fighter* PC a run for its money.



Get ready to rumble across storm torn cityscapes in *CyberGladiators.*

Motion capture makes *CyberGladiators'* combat hauntingly realistic, while Direct3D support ensures those armed with a compliant 3D accelerator will see some serious polygon pushing. On a Vérité-based card, you'll instantly appreciate the power when vastly-improved frame rates, and bilinear filtering engage. Motion blurs and radiosity lighting heighten the visual splendor.

Gameplay, for once, hasn't been compromised for a pretty picture. Timing your hits to create combos may take some practice, but there's a method for chaining attacks together. Auto-chain combos and throws are also in full effect, and player control is tight and responsive—the only caveat being that you'll need the fastest Pentium and a Direct3D-compatible accelerator to get the most bang for your buck (thankfully, you can adjust detail levels down to suit your system if it can't pump the polygons).

Is *CyberGladiators* perfect? No. Where's the combo meter? The practice mode? For a 3D game, lateral movement is sorely missed, and the fact you *can't* hit an opponent while they're picking up a weapon is ridiculous.

Sierra's first foray into the fighting game arena is a bold first step. *CyberGladiators,* while not flawless, packs the visual seductiveness and responsive gameplay to warrant some serious gamepad spanking.

— Andrew Sanchez

boot verdict

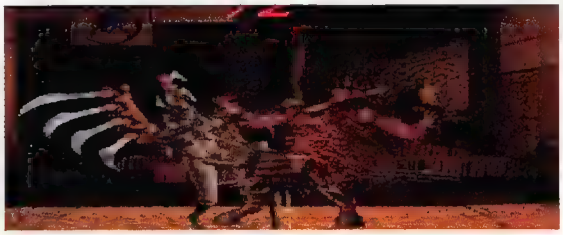
PRICE: $39.95
COMPANY: Sierra On-Line
PHONE: 800.757.7707
URL: www.sierra.com

9

Pray for Death

Going strictly on Instinct

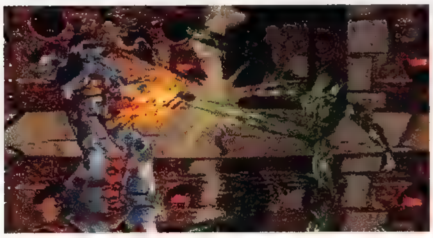
Pray for Death isn't lacking in the gore department.



"Kids really dig Nintendo's *Killer Instinct.* Let's make a version for the PC!" The idea probably sounded good a year ago, but today, even *Street Fighter* is jumping from 2D sprites to 3D polygons. Does the world need another 2D fighting game?

In yet another nameless tournament (this time sponsored by Death himself), *Pray for Death* has you commanding one of 10 souls willing to beat the spirited crap out of one another.

Pray for Death is drop dead gorgeous—with stunning *Lightwave 3D* backdrops providing tantalizing settings for your beat downs. From the inner sanctum of an Egyptian tomb to the watery realm of Cthulu, *Pray for Death* hosts some of the largest and most lively animated 2D sprites (also passed through *Lightwave 3D*) ever seen in a PC fighting game. To shove these megasprites around, you'll need a powerful Pentium to keep the frame rate up, despite the 320x200 256-color graphics. Visual sparkle and panache—from semitransparency, radiosity light sourcing, to some truly cool reflection-mapping effects (watch the watery floor in Cthulu's stage for example)—make *Pray for Death* one of the best looking PC slugfests ever.



Ancient other-dimensional god vs. mechanized killing machine. Hmmm... sounds like a fair fight to me.

Unfortunately, gameplay doesn't come close to matching the saucy looks. Unless you *Pray for Death* on a fast Pentium, expect combat to be sluggish and control to be unresponsive. The game's timed chain combo system (stolen from—all together now—*Killer Instinct*), initiates a multi-hit combo with a simple command. Entering another command during the combo adds another chain of hits on top of the current attack. Expect to get slapped upside the head with 21-or-more hit combos (except if you know the combo breaker which stops your pesky opponent from whupping your sorry fanny). More traditional *Street Fighter*-style individual punches and kicks are also used, but to a lesser degree.

Despite some cool fighters and the awesome 3D-rendered graphics, *Pray for Death* steals one too many concepts from *Killer Instinct* to be called anything other than a knockoff. If imitation is the highest form of flattery, Nintendo must be really flattered.

— Andrew Sanchez

boot verdict

PRICE: $29.99
COMPANY: Virgin Interactive
PHONE: 800.874.4607
URL: www.vie.com

5

Hard **Drives** With **Room** to **Grow** Into

Barracuda 4LP and Tomahawk 9

You're in the middle of saving the single most important file of your life, when the following message flashes across your screen: "You have run out of disk space on drive C:." Sure, you could always delete programs to make space, but that paltry one gig drive that came with your PC would just fill up again overnight. You need a long-term solution. Bite the bullet and buy a bigger drive.

The bootLab recently tested two new drives—Seagate's Barracuda 4LP ST34371W and Micropolis' Tomahawk 9 3391WS. Both drives were compliant with SCSI 3, SMART (Self-Monitoring, Analysis, and Reporting Technology), and SCAM (SCSI Configured Automatically) protocols, and both are rated for a one million hour MTBF (mean time between failures). In fact, the only major differences were the storage capacities and price tags—the Barracuda's 4.3GB cost $1,100, while the Tomahawk's 9.1GB cost $2,900.

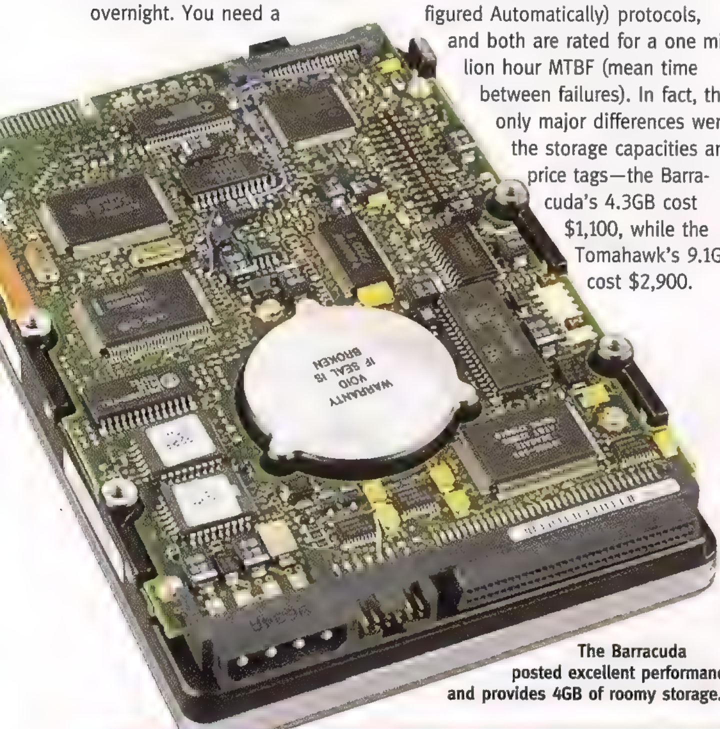
Head to Head

	BARRACUDA	TOMAHAWK
Formatted capacity (GB)	4.35	9.1
Interface	Ultra-SCSI	Ultra-SCSI
Discs	5	12
Cylinders	5,288	4,735
Height (inches)	1	1.625
Width (inches)	4	4
Depth (inches)	5.47	5.75
Weight (pounds)	1.5	2.0
Recorded Transfer Rate	1240K/sec	1010K/sec
Average Seek Time	8 seconds	8 seconds
Data Throughput	25.9MB/sec	26.1MB/sec
Boot Up Time	57 seconds	58 seconds

We tested the drives in our standard 166MHz Pentium machine, equipped with 16MB of RAM, a Diamond Stealth 3D 3000 XL video card, and the always trusty Adaptec 2940 Ultra Wide SCSI controller card. We tested with Ziff-Davis' Disk WinMark, and Norton Utilities' Disk Throughput (emulating a multitasking environment). We also streamed video using Intel's Smart Video Recorder and Asymetrix's Digital Video Producer, and clocked boot times for Win95.

In terms of raw performance, the Barracuda edged out the Tomahawk, with a data transfer rate of 1240K/sec to 1010K/sec respectively. In terms of data throughput however, the Tomahawk nicked the Barracuda, but by only 0.2MB/sec. Both booted into Win95 in less than a minute, and handled streaming video with equal aplomb.

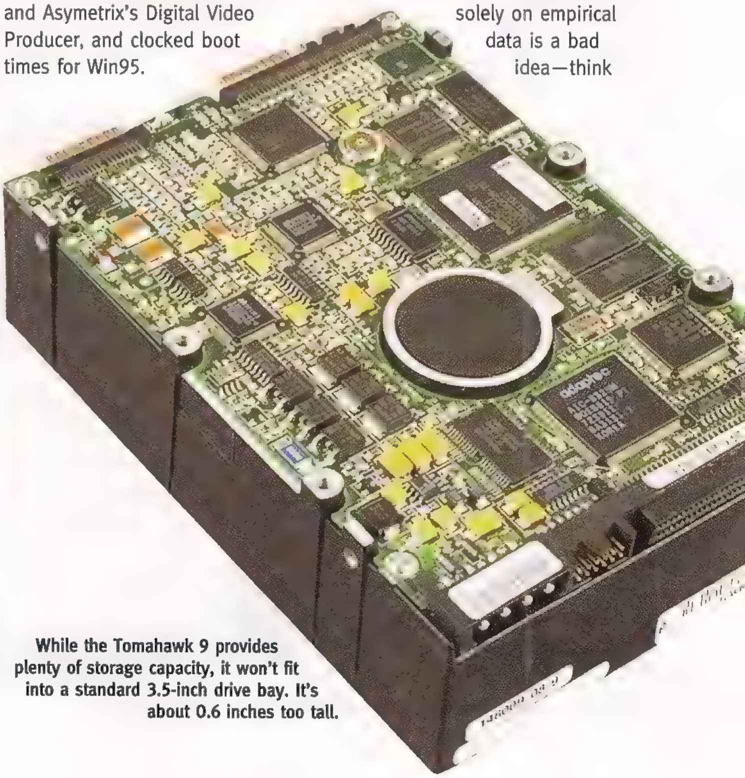
But basing your purchases solely on empirical data is a bad idea—think



The Barracuda posted excellent performance and provides 4GB of roomy storage.

Things to Remember

- If you're running DOS or Win95 (OSR1 release), your partition sizes will be restricted to a maximum of 2GB each. Only with NT or OSR2, will you be able to assign 100 percent of the drive space to one partition.
- Systems with an advanced BIOS will allow you to boot with either an IDE or a SCSI. For systems that don't, you'll have to remove your IDE hard drive, and adjust the CMOS parameters before you can boot with the SCSI drive.
- After you've created the DOS, Logical, and Extended partitions, don't forget to set the active partition. Otherwise, your system won't boot!
- Don't install two versions of the same operating system on the same partition, unless you're running nifty tools such as *System Commander.* If you want to run multiple OS's, use separate partitions.



While the Tomahawk 9 provides plenty of storage capacity, it won't fit into a standard 3.5-inch drive bay. It's about 0.6 inches too tall.

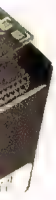
Five Steps to a Healthy Hard Drive Relationship

- Make sure the manufacturer, or the store you purchased from, has a liberal return policy should anything happen to the drive.
- Stick to well-known manufacturers—your data is too important to trust to a stranger.
- Inspect the drive to see how it's made or how well it's been cast.
- Until a few months ago, 5,400rpm drives were the norm. Current drives with a 7,200rpm spindle speed generate a lot of heat, and have *just* recently proven to be reliable. Drives with a 10,000rpm spindle are expected in late 1997.
- Accept nothing less than a five year warranty.

long-term reliability. A drive with the fastest transfer rate known to man is useless if it crashes a couple of months after being installed. Hard drives should have a *minimum* MTBF rate of 250,000 to 300,000 hours (and newer drives are rated for one million hours)—anything less, and you're looking for heartache.

But even if the MTBF rate falls within these guidelines, many manufacturers accelerate the testing process, and statistically interpolate the data (for example, they may consider one hour of testing equal to four hours of real use). And since only a small sample of drives are ever tested, the MTBF rating is less than precise. Having said that, both Seagate and Micropolis consistently produce quality products, so both drives are recommended.

— *Bryan Del Rizzo*



boot verdict

PRODUCT: Barracuda 4LP
PRICE: $1,100 ($0.25/MB)
COMPANY: Seagate Technology
PHONE: 800.732.4283
URL: www.seagate.com

8

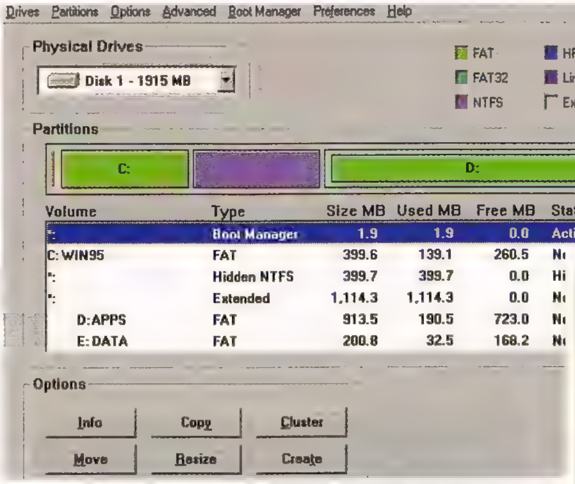
boot verdict

PRODUCT: Tomahawk 9
PRICE: $2,900 ($0.32/MB)
COMPANY: Micropolis
PHONE: 800.395.3748
URL: www.micropolis.com

8

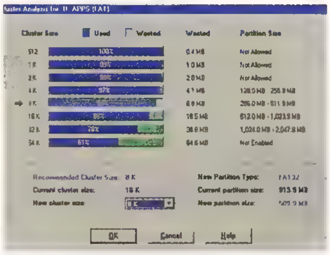
S/W

boot KICK ASS! PRODUCT



Volume	Type	Size MB	Used MB	Free MB	Status	Pri/Log
*:	Boot Manager	1.9	1.9	0.0	Active	Primary
C: WIN95	FAT	399.6	139.1	260.5	N	
*:	Hidden NTFS	399.7	399.7	0.0	Hi	
*:	Extended	1,114.3	1,114.3	0.0	N	
D:APPS	FAT	913.5	190.5	723.0	N	
E: DATA	FAT	200.8	32.5	168.2	N	

You'll be moving partitions faster than Merlin with *PartitionMagic 3.0.*



Recommended Cluster Size: 8 K
Current cluster size: 16 K
New Partition Type: FAT32
Current partition size: 913.5 MB

Ever wonder where all that room on your 1.2GB hard drive disappeared to? With Cluster Analyzer, you'll wonder no more.

PartitionMagic 3.0

You've got the power

Unleash your disk partitioning prowess with *PartitionMagic 3.0*, a potent program that deserves a home on your hard drive.

Disk partitioning has always been an arcane science left to the venerated of techno-magi. But, with more and more folks discovering the pleasures and perils of multiple OS's and ever-larger hard drives, the necessity to learn the dark arts becomes inevitable. But, with the limitations of DOS's FDISK and FORMAT command, what's an aspiring acolyte to do?

Enter *PartitionMagic 3.0.*

Building upon the solid foundation of *PartitionMagic*'s on-the-fly resizing and repartitioning techniques, *PM3.0* adds features to an already impressive package, with the inclusion of bidirectional Win95 OSR-2/FAT32 support (convert to and from FAT), and NTFS support for NT 4.0. A new Cluster Analyzer tells you how efficient your data storage on a drive is, and suggests solutions to keep data overhang to a minimum (although many times *PM3.0* recommends cluster sizes that are just *too* unreasonable—don't ask us to repartition a 512MB hard drive down to 120MB!).

All the tools you've grown to rely on are still here (resizing, creating, formatting, and moving partitions), and they're more robust than ever before. Copying or backing up key partitions is as simple as invoking PartitionCopy.

But, don't be fooled by the installation program and the general look of *PM3.0*—it may appear to be Win95-based, but behind the smoke and mirrors it's still a DOS application that will shortcut to a full DOS session (not a windowed DOS shell) for all the important wand waving.

The inclusion of IBM's *Boot Manager* is questionable, (we prefer the robustness of *System Commander* for multi-operating system/multi-boot scenarios), but MicroHelp's *Application Mover* comes in handy for spiriting programs and their related files from one partition to another.

Real-world use proved easy—our new Quantum 3.2 Tomahawk SCSI drive was partitioned with ease. And with *PM3.0*'s easy-to-understand visual cues, you'll be extending those partitions in no time. Moving free space and adjusting partition sizes to meet your cluster efficiency needs is as simple as sliding graphical bars around. You can resize and modify existing partitions, but like everything exciting in life, you'd better take precautionary steps (back your data up) before invoking this spell.

Partitioning is never an easy or comfortable subject. But, with massive hard drives becoming a part of the landscape and the ever-looming danger of cluster overhang, you need power at your disposal. If you don't have *PartitionMagic 3.0* in your arsenal, you don't deserve the title of "power user."

— *Andrew Sanchez*

boot verdict

PRICE: $69
COMPANY: PowerQuest
PHONE: 801.226.8977
URL: www.powerquest.com

9

Basketball **Madness**

Breakin' ankles on the hard courts

Developers nowadays throw enough technique and technology (not to mention money) into slamming every available bell and whistle into basketball games that even Michael Jordan's getting jealous. Old-school 2D sprites have been blocked out for motion-captured, texture-mapped polygon players dribbling to CD-audio beats. The schoolyard game has grown up as quickly on screen as it has on the court.

Video basketball comes in two flavors these days: small squad competition with cartoon physics and full squad season sims.

This month we've scouted out four NBA draft picks for you to consider, plus a couple of bonus babies ripe for signing. It all comes down to what you like, but just ask yourself one question: Have you got the love?

— Jason Boor

Try it out! demo on the bootDisc

NBA Full Court Press

Draws the foul

Two years ago, *Full Court Press* might have been a good basketball game. Today, it simply lacks the heat any self-respecting basketball game must generate.

In the alchemy that is game design, *Full Court Press* sacrifices "in your face" arcade action for too many simulation-like qualities. The stat charts are so comprehensive that you'll feel more like Alonzo Mourning's accountant than 'Zo himself. And while the up-to-date stats can be edited to follow the season's transactions, it's a grueling and time-consuming process.

Despite *Full Court Press*' incredible 1280x1024 resolution in 256 colors, the three-quarter isometric view (adjustable between a half-court cam and a close-up quarter-court shot) looks archaic by today's standards. The rendered players sport thick black outlines to separate them from the background, and this creates the impression that the teams are made up of stained-glass creatures. When viewed closely, the motion-captured 2D sprites still get pixelated, even at the highest graphics resolution. In addition, there's nowhere near enough variety to their moves—the players all dribble, shoot, and hunch over exactly the same. It's like clone ball.

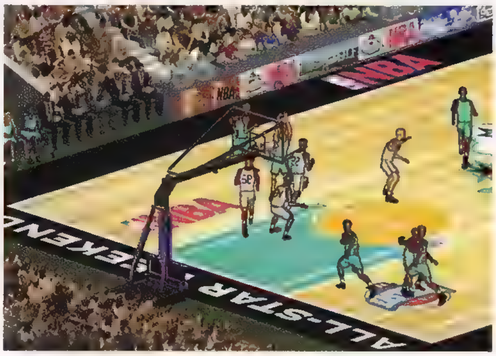
The only floatation device that keeps this game from sinking is real-life announcer Kevin Calabro. His constant stream of witty comments rarely repeat and add authentic basketball flavor.

Even with its four-player modem option, this game is just bland.

boot verdict

PRICE: $44.95
COMPANY: Microsoft
PHONE: 800.426.9400
URL: www.microsoft.com

5



Not even 1280x1024 SVGA (albeit 2D sprite-based) can save *NBA Full Court Press* from flat gameplay.

NBA Hang Time

Breath the air up there

When it comes to sheer arcade action, *NBA Hang Time* wears the ring. Following in the sneakers of *NBA Jams*, *Hang Time* takes dunking and adds the most exaggerated hang time imaginable.

NBA Hang Time is a solid arcade-to-PC translation. It moves really fast, has cool background music, and most importantly, it has some of the most outrageous dunks ever witnessed. What really separates *Hang Time* from the pack is the option to create your own player. Sure, you can always play as your favorite NBA star, but now *you* can share the joy of jamming on David Robinson's aircraft carrier flattop.

Despite all this adrenaline, *Hang Time* still has flaws. For starters, is it a fashion statement to make sprites extremely pixelated? If it weren't for the jersey colors, you couldn't tell Penny from Pippin. And, when dribbling "coast to coast," the game tries to move so fast that the animation skips, making players look choppy. But what really stinks is the announcer. Same old phrases and a lame-ass voice. We want pizzazz, embellishment, unrestrained flagrance. We want guttural sounds that catapult us back to our primal roots.

Despite a couple of annoying shortcomings, the overall gameplay of *Hang Time* outweighs those discrepancies. With *NBA Jams* getting gray, *Hang Time* is a definite go-to player.

boot verdict

PRICE: $39.95
COMPANY: GT Interactive
PHONE: 800.610.4847
URL: www.gtinteractive.com

7

Queen of the Court

Time to post up

Queen of the Court is a state-of-the-art "around the world" interactive stimulation, I mean simulation. The idea here is to beat the three honeys of hoop at a "friendly" game of horse. Now don't be fooled, these so-called honeys are Atlantean's "top ball handlers." [Their words, not ours.]

Just realize this game wasn't developed to fine-tune your basketball fundamentals. It's a simple game... with a stripper. You flick the ball in the hole by holding the mouse button and sliding the mouse. If you win, you see a thumbnail digitized flick of some half-naked lady.

Bigger video would be nice, but without it, there's very little to get excited about.

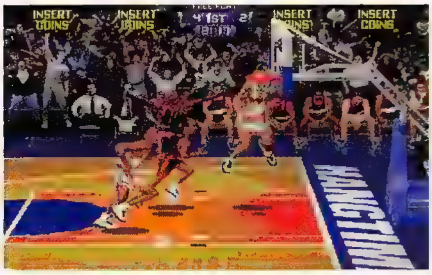
—JB

***Queen of the Court* may not be the basketball sim of the year, but it does have a few redeeming qualities.**

boot verdict

PRICE: $29.95
COMPANY: Atlantean Interactive
PHONE: 800.822.8339
URL: www.atlantean.com

4



Despite reliance on 2D sprites, ***NBA Hang Time*'s** intense arcade action is hard to beat.

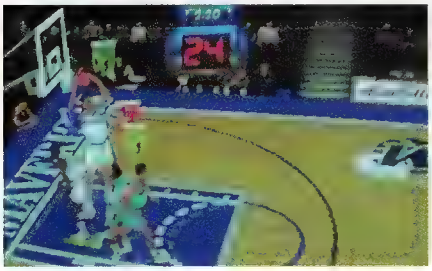
NBA Jam Extreme

Is it the shoes?

Time was that even the heartiest hoops bogged down when it came time for five-on-five play. Thus was born the two-on-two format, embellished, of course, with outrageous antics. Well, with hoops sims becoming more complex and adding more depth, games such as *NBA Jam Extreme* and *NBA Hang Time* are becoming less appealing. On the other hand, dunking a flaming ball from the three-point line still provides smooth satisfaction.

NBA Jam Extreme still has that popular two-on-two slamfest feel. With roster updates, a substitution feature, and the addition of the "Extreme" button, it's hard to say why this game has lost its edge. Gone are the sprite-based characters from the original. This version's 640x480 DirectX-enhanced texture-mapped polygon characters are identical to the arcade quarter muncher. Missing, though, is the shattering of the backglass. Man, that always felt good. Still, the new Extreme button allows extraordinary dunks. Tap the Extreme button for ankle breaking crossovers. Overall, the player animation is fluid and the game moves exceptionally fast.

The *Jam* series could last forever, with the proper embellishments. Unfortunately, with competition such as *NBA Live '97*, this game will only be a success in the arcades.

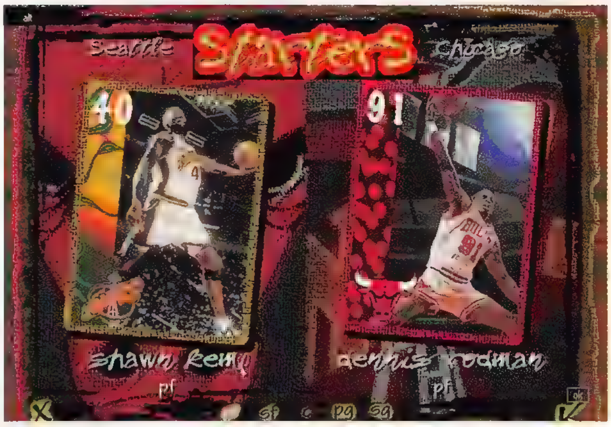


A picture-perfect arcade translation makes ***NBA Jam Extreme*** a contender.

boot verdict

PRICE: $49.99
COMPANY: Acclaim
PHONE: 516.656.5000
URL: www.acclaimnation.com

6



Glorious SVGA pics of your favorite NBA stars are tasty snacks to ***NBA Live '97*'s** main course.

NBA Live '97

This game's got game

Of all the basketball games available for the PC, *NBA Live '97* is the best. EA successfully combines sim-style options and arcade action into one game. This game is, no doubt, *the* game.

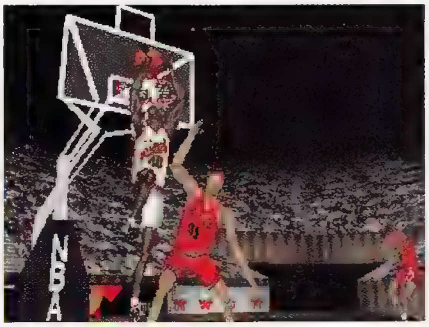
The action begins with an intro packed with more real NBA highlights than any living being has ever witnessed. After recuperating, select from four levels of challenge: rookie, starter, all-star, and superstar and *all* the NBA teams, complete with players, stats, and logos. This already blows away half of the competition. Swiveling camera angles add to the in-your-face gameplay. The 640x480 SVGA texture-mapped polygon players run at silky-smooth frame rates.

What more could you possibly ask for? Shiny courts? They're there.

EA really focused on stats, graphics, and most importantly—gameplay. Even though the game speed is on the slow side, the overwhelming amount of options compensate. Not only can you trade dead wood bench riders and draft the free agents that'll be the difference between a ring or a ride home, but you can also create custom players down to the smallest detail.

Even if you master the superstar difficulty, modem and LAN gameplay make it possible to play against the best. That would be me... just kidding.

Nothing competes with *NBA Live '97*. The dunks, the three-point fadeaway, the announcer... This game simply has it all. In fact, it should be mandatory that you own this game.



***NBA Live '97*'s** texture-mapped polygons fly up and down the court.

boot verdict

PRICE: $54.95
COMPANY: Electronic Arts
PHONE: 800.245.4525
URL: www.ea.com

9

Space Jam

Elmer Fud for three

Michael Jordan, the best basketball player in the world, is matched up against some of the galaxy's toughest "monsters" in Acclaim's *Space Jam*.

Slamming the ball home with Yosemite Sam has never been more fun. Of course, there's never been the opportunity before. *Space Jam* has stats on all the Looney Toons characters, hilarious power ups, and a LAN option. Play head-to-head, two-on-two, or play for all the marbles in a three-on-three Monstars vs. Toons tournament.

This is a fun basketball game.

But don't expect too much from the 320x200 256-color VGA graphics. The blocky 2D cartoon characters possess just enough animation to make the players look like they're dribbling and running down court. If Acclaim had gone the extra mile and added more colorful dunks, that might have compensated.

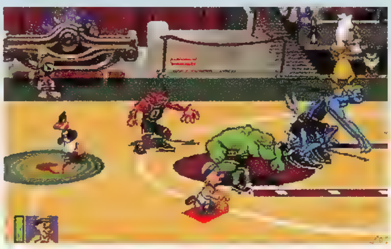
This cartoon jam-o-rama coulda been a contender; instead it just leaves me feeling kinda flat.

—JB

boot verdict

PRICE: $39.99
COMPANY: Acclaim
PHONE: 516.656.5000
URL: www.acclaimnation.com

6



Daffy Duck dunking? *Space Jam* lets you live out your cartoon fantasy.

S/W

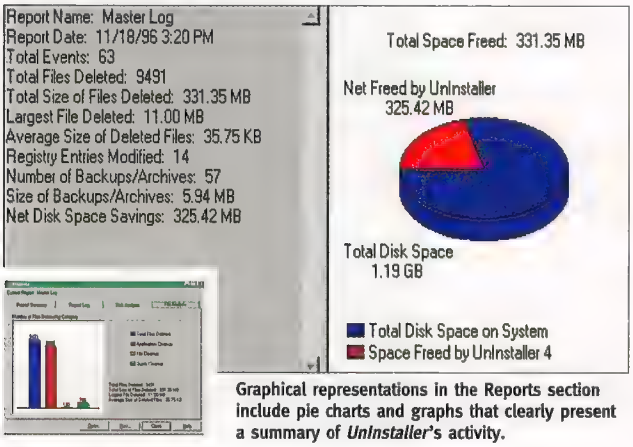
Try it out! demo on the bootDisc

UnInstaller 4

Playin' it safe

Junk, debris, crap, garbage. Call it what you like, but it's there, and trashing the junk with a dedicated utility is the only way to go if you want to clean up fast and safe. Complete uninstallation help for systems running Win95 and NT is available with the latest version of *UnInstaller.*

UnInstaller 4 works equally effectively with apps installed before or after activation of the program. It gives the flick to the usual unnecessary Windows system files: duplicate files, screen savers, fonts, multimedia files, help files, etc.; but also performs more complex evictions with ease. SmartLinks technology creates a database of the apps and file interrelationships on your hard disk and checks your system's DLLs, VBXs, and OLEs to see exactly which are safe to delete. LNKs files can also be located and the outdated ones removed.



Report Name: Master Log
Report Date: 11/18/96 3:20 PM
Total Events: 63
Total Files Deleted: 9491
Total Size of Files Deleted: 331.35 MB
Largest File Deleted: 11.00 MB
Average Size of Deleted Files: 35.75 KB
Registry Entries Modified: 14
Number of Backups/Archives: 57
Size of Backups/Archives: 5.94 MB
Net Disk Space Savings: 325.42 MB

Total Space Freed: 331.35 MB

Net Freed by UnInstaller
325.42 MB

Total Disk Space
1.19 GB

🟦 Total Disk Space on System
🟥 Space Freed by UnInstaller 4

Graphical representations in the Reports section include pie charts and graphs that clearly present a summary of *UnInstaller's* activity.

Version 4's SmartLinks work just as thoroughly as in previous versions, but far more rapidly, taking 20 seconds to scan my system (pretty snappy compared to the two minute wait with the previous version); and are automatically updated as apps change, so unlike version 3.5, you don't have to make a point of regularly updating your SmartLinks database.

Other improvements include a completely overhauled interface that's clear and easy to navigate, and a Group Delete feature so you can delete, archive, or move all the apps in a folder in one hit, making for speedy uninstallation: a 60MB program takes a quick 20 seconds with *Uninstaller 4*, compared to a four minute wait when using version 3.5.

Improved reporting in version 4 provides thorough descriptions and graphical analysis so you can keep precise track of changes made to the Windows Registry, making this uninstaller utility even safer and allowing you to get really specific with your clean-up. (And should you get carried away with your deletions, the Automatic Backup feature restores files before you have the chance to say "Doh!")

It isn't as aggro as many other uninstallers, but *UnInstaller 4*'s caution, intelligence, and thoroughness are preferable to a load of brainless muscle flexing.

— Ingrid Bush

boot verdict

PRICE: $39.99
COMPANY: MicroHelp
PHONE: 800.777.3322
URL: www.microhelp.com

8

H/W

Teac's CD-512E is but one of a growing number of 12x CD-ROM drives begging for attention.

CD-512E 12x

How much is that 12x in the window?

Buying into the next breed of 12x CD-ROM drives is like getting a puppy: they all claim excellent pedigrees, they all desperately need a new home, and there's more of them popping up every day. On the surface, the CD-512E looks like a strong pup.

The CD-512E is Teac's entry into the brutal 12x CD-ROM drive pit fight—going toe-to-toe with Toshiba (see *boot* 05), and Mitsumi (see page 84) in a battle for speed supremacy.

The CD-512E's specs show some teeth: an EIDE/ATAPI interface (supporting DMA Mode1), 1800K/sec sustained data transfer rate, and 160ms access time. Teac packs in real-mode DOS drivers and a DOS audio-CD player for those who think resistance to Win95 *isn't* futile. As a side note, this CD-ROM drive has the *fastest* caddy-less tray loading mechanism I've ever seen—it moves like lightning!

Reality, unfortunately, comes back to chomp the Teac CD-512E like a rabid Rottweiler; starting with a smaller than expected 128K cache, performance is disappointing... considering its pedigree. The CD-512E's average transfer rate of 954K/sec places it below Toshiba's XM-5702B 1030K/sec, while access time actually clocked in at 163ms (slower than other 12x CD-ROM drives, which clock in at 125ms). And CPU utilization collared a whopping 85 percent! Until motherboard manufacturers and Microsoft get their act together with bus mastered DMA EIDE devices and *proper* implementation and support (see *boot* 05's sidebar with the Toshiba 12x review), your results with any EIDE bus mastered device *will* vary. Video playback (whether in Win95 or DOS) is smooth and flawless—no herky-jerky video or choppy audio, whether in *Wing Commander IV*'s 16-bit cinematics, or Window's AVI test clips.

Moving beefy files proved easy, with the CD-512E transferring 579MB from CD to hard drive in 5 minutes and 39 seconds; while loading time for *WCIV*'s first mission clocked in at 8.47 seconds. Not bad... but we've seen better.

The Teac CD-512E doesn't bite but will have to howl louder if it wants to get attention and ultimately find a home.

— Andrew Sanchez

boot verdict

PRICE: $149
COMPANY: Teac
PHONE: 213.726.0303
URL: www.teac.com

6

S/W

Try it out! demo on the bootDisc

SkyNet

Limited

SkyNet, Bethesda's sequel to *Terminator: Future Shock*, will blow you away with multiplayer carnage, new missions, and sharper graphics (it will even update *Future Shock* if you own it); but behind all this lurks the XnGINE, Bethesda's contender to the 3D polygon engine throne.

XnGINE looked impressive six months ago. But today, id's *Quake* sets the standard; and with Epic's *Unreal*, 3DRealms' *Prey*, and LucasArts' *Jedi Knight: Dark Forces 2* pushing the envelope even further, what does *SkyNet* offer? Not much.

Phased-plasma rifles will teach those machines the error of their ways.

Despite boasting 640x480 256-color graphics, *SkyNet*'s low-resolution texture maps are almost devoid of colors and succeed in turning post-apocalyptic Los Angeles into a drab place (whether on foot, in a Jeep, or by air). While frame rate was acceptable in SVGA, it was far from smooth. Too bad Bethesda decided not to support any 3D acceleration with XnGINE games. Another solution would have been to offer more resolution options (360x240 or 400x300). The sight of your 2D weapon in the foreground looks dated in XnGINE's 3D world, as do the many pixelated sprite-based objects strewn about the landscape.

The antagonists in *SkyNet* still lack polygon count. This may not be bad for the airborne Hunter-Killers and earthbound Goliaths, but the T-800s look awful—boxy heads and pointy toes make these soulless killing machines resemble erector set models (and the humans look even worse). Horrid FMV briefings and digital sound effects that sound as if they were lifted straight from *Doom* don't help matters either.

The final straw is when you get stuck inside a stationary object and the only way to escape is to reload/restart the level.

Battle as one of John Conner's Resistance fighters or crush humanity with a chrome fist in Bethesda's *SkyNet*.

LAN or Internet connections (via Kali) allow you to join the ranks of the human Resistance or enter the hyperalloy combat chassis of a Terminator in a fast and furious frag-fest (but there's no head-to-head via modem or serial cable).

SkyNet is a game that tries to shoehorn multiplayer aspects into an existing engine, but winds up forgetting about gameplay.

— *Andrew Sanchez*

boot verdict

PRICE: $39.99
COMPANY: Bethesda Softworks
PHONE: 800.677.0700
URL: www.bethsoft.com

5

H/W

12x Multimedia Kit

The end is near

Waiting for DVD is like waiting for the second coming. In the meantime, Diamond's upgrade kit includes a 12x CD-ROM drive, a wavetable sound card and stereo speakers. Not all the components are heaven-sent, but the drive's angelic performance proves CD-ROM technology shouldn't be crucified just yet.

The 12x CD-ROM drive posted an impressive disk transfer rate of 978K/sec with our 166MHz Pentium, but consumed 60 percent of the CPU cycles in the process. The access time of 128ms was even slightly below Diamond's own claims of 130ms. And the 5 minutes and 34 seconds it took to copy 579MB of data files was one full second faster than the Toshiba SCSI 12x reviewed in *boot* 05. Hallelujah.

The 32-voice wavetable card actually sounded pretty good, considering the 2MB ROM patch set is compressed into a measly 0.5MB. If you're concerned about backward compatibility, don't be—the card is hardware ADPCM Sound Blaster-compatible too. The card features binaural stereo enhancement (the poor man's version of 3D sound), but no *real* 3D positional audio.

Of the main components, only the 12x CD-ROM and the wavetable sound card are worth a damn.

The kit's quick and easy installation is a testament to its Plug-and-Play compliance—both the Mitsumi 12x EIDE CD-ROM drive and the wavetable sound card were up and running in minutes. Speaker installation was painless—but playback wasn't. The Labtec LCS-1012 four-watt speakers are adequate for system beeps, but pumping any serious audio without a subwoofer or bass control is grounds for martyrdom.

Aside from the speedy 12x CD-ROM drive, this is pretty standard fare. But with 12x drives retailing for less than $200 by themselves, and enhanced sound cards on the horizon, you'd be better off purchasing the components separately... unless you *really* want the copy of *Ecco the Dolphin* that comes bundled with this kit.

— *Bryan Del Rizzo*

boot verdict

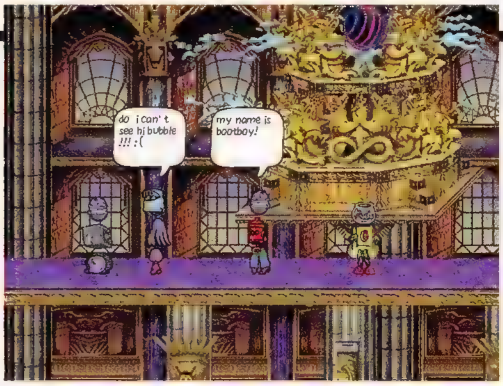
PRICE: $399
COMPANY: Diamond Multimedia
PHONE: 800.468.5846
URL: www.diamondmm.com

6

Try it out! demo on the bootDisc

Castle Infinity

Infinite online fun for the younger set



While exploring the Castle, you can chat with other players by typing comments in these word balloons.

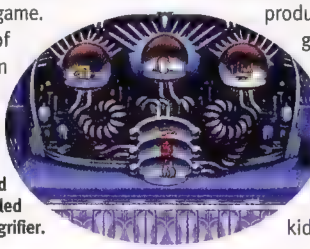
Within the safe confines of *Castle Infinity* kids can engage in rousing multiplayer gaming online via their existing ISP account.

As many as 1,000 kids can play simultaneously, so emphasis is placed on teamwork and cooperative play; a refreshing change of pace from violent head-to-head action. The Minisub, for example, won't function unless four kids team up to operate its propellers.

The game is set in two locations: the child's room and the castle. While in their room, kids can read and write, send and receive postcards from other children registered in the Castle, and also check their progress in the game.

The adventure portion of *Castle Infinity* takes place in seven distinctive halls, including the Hall of Science, Chaos Corridor, and Art U-See'Um. These are side-scrolling environments—47 in all—inhabited by evil monsters (including an obnoxious, snot-nosed brat named Irvin LePoe). Kids will need to collect a series of monster repellents, ranging from air freshener to atomic Limburger cheese, to get rid of them.

Castle Infinity looks and sounds great. The backgrounds and game scenes were produced using *3D Studio* and *Photoshop*, and all the animated cut scenes were drawn, inked, and painted by hand. The voice-over tracks were produced by the San Francisco a cappella group The Bobs.



Since real kid DNA can't exist in the Castle, you'll have to select a new torso, head, and legs using a contraption called the You-Matic Transmogrifier.

Unlike allowing kids to surf the web unattended, *Castle Infinity* is a supervised playground. Starwave employees patrol each hall, monitoring progress and conversations, and a Security Alert feature allows kids to flag any wrongdoing. The game also features a language filter, so if someone tries to utter a profanity either in real-time conversation or in a postcard, the offending word(s) are replaced with the word "flower."

With its emphasis on cooperative play and communication, *Castle Infinity* gives children a great opportunity to play on the Internet. Just make sure your ISP doesn't charge by the hour.

— *Bryan Del Rizzo*

boot verdict

PRICE: $39.95 unlimited version ($9.95 four-hour limited version) plus ISP charges
COMPANY: Starwave
PHONE: 206.957.2000
URL: www.starwave.com

8

Try it out! demo on the bootDisc

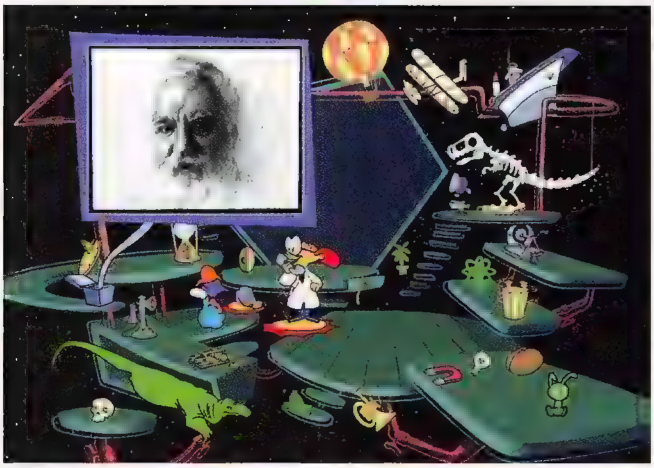
boot KICK ASS! PRODUCT

Virgil Reality

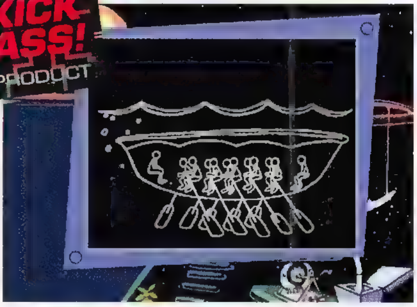
Sounds of science

Virgil Reality is a thoroughly engaging trip through the world of science, combining an interactive laboratory and an encyclopedic science library in a madcap format that will appeal to kids and parents alike.

You're guided through this animated universe by Professor Virgil Reality (voiced convincingly by Charles Fleischer) who explains, educates, and encourages scientific experimentation. Along the way, view historic film footage from the National Archives and NASA, or check out wacky inventions such as the Police Hooking Car and Alarm-O-Bed. Browse biographies of famous inventors, such as Enrico Fermi (the Manhattan Project) and Ada Lovelace (the world's first computer programmer); perform simple experiments to discover basic scientific principles; or view slides on an electron microscope.



That's not Santa Claus! It's Alexander Graham Bell, inventor of the telephone.



In *Virgil Reality* you can explore lots of cool inventions including the world's first submarine.

Virgil Reality's animation and production values are top notch, (including the catchy "Biology Song" co-written by Fleischer and Scott Paige, the former saxophonist for Pink Floyd).

If life were a science fair, *Virgil Reality* would win the blue ribbon for sure.

— *Bryan Del Rizzo*

boot verdict

PRICE: $39.95
COMPANY: 7th Level
PHONE: 800.884.8863, ext. 77
URL: www.7thlevel.com

9

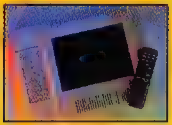
boot radar

PRODUCT ANNOUNCEMENTS: THEY **TELL** US, WE **PASS** IT ALONG

Stack 'em, Danno

Put a **MediaStak Multimedia Management System** in your office and you won't use your CDs as coasters anymore. MediaStak features removable insert trays for about $18 that accommodate up to eight types of computer media including CD-ROMS, diskettes, data cartridges, and videotapes. Modular units ranging in price from $109 to $179 stack together vertically and horizontally, and can easily be transported using an optional trolley base. Each drawer features an anti-tip device and stop mechanism to prevent drawers and data from falling out.
Abbot Office System: 800.631.2233

Writing on the Wall



What? That 21-inch monitor isn't big enough for you? Consider the $3,595 **MagniView 498**, an LCD projector with state-of-the-art 800x600 SVGA resolution. Lightweight and portable, the MagniView 498 weighs only 6.5 pounds and features a three-watt stereo speaker system, active-matrix screen, and built-in support for NTSC, PAL, and SECAM video. The remote control lets you magnify projected images, point to objects on the screen, or even conceal portions of the presentation.
Dukane Corporation: 888.238.5263; www.industrynet.com

Suffering Succotash!

Don't go loony searching your unlabeled diskettes—get loony instead with the first-ever licensed **Looney Tunes diskettes.** The 10-pack of 3.5-inch diskettes contains an all-star cartoon lineup including Daffy Duck, Taz, Tweety, Sylvester, and Bugs Bunny. Each 10-pack retails for $12.99 and features two diskettes of each image.
Fellowes: 800.945.4545; www.fellowes.com

Hot Swapping

Adaptec's new **AHA-8940 PCI-to-1394 Host Adapter** takes advantage of the new IEEE-1394 serial communications standard—commonly known as FireWire—for high-speed data transfer rates and hot swapping peripherals. With data transfer rates of up to 200MB/sec, the AHA-8940 guarantees data transfer through the use of isochronous transport of multiple time-critical data streams. The card is designed to connect up to 63 devices via easy-to-use cables and connectors for true Plug-and-Play. Windows NT 3.51 and 4.0 are currently supported, with support for Win95 on the way. Developer kits are available now for $599; retail stand-alone and OEM units are expected to ship in early 1996, but pricing has not yet been determined.
Adaptec: 800.442.7274; www.adaptec.com

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Harley Hahn's
Internet & Web
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1997 Edition

Lost on the information superhighway? Browse the **Internet & Web Yellow Pages.** This book helps you find the best and most interesting sites on the web. Thousands of new and revised sites are included. Editor Harley Hahn provides warm and humorous descriptions of the electronic directory, along with his personal treasury of interesting facts, jokes, Internet discoveries, and souvenirs. The price of $29.95 includes a hot-linked version on CD-ROM.
Osborne News: 510.549.6600; www.osborne.com

Front Row and Center

Throw away the cheap speakers that came bundled with your system! Hook up Cambridge SoundWorks' **MovieWorks**, a powerful new home-theater speaker system for use with Dolby Pro-Logic and AC3 surround-sound systems. MovieWorks consists of a pair of shielded two-way main speakers, a low-profile, two-way center-channel speaker, a pair of dipole radiator surround speakers, and a 140-watt powered subwoofer. The thundering sub is capable of distortion-free response to below 30Hz at a sound pressure level of 100dB. Available now for $1,299.
Cambridge SoundWorks: 800.367.4434; www.hifi.com

Simple Simon Met a Pie Man

SimpleStation is a newly designed internal PC card adapter that enables a quick and seamless interchange of PC cards between portable computers and desktop systems. Priced at $160, the SimpleStation mounts in a 3.5-inch or 5.25-inch drive bay and connects to a PCI controller board. SimpleStation provides full support for all memory, storage and I/O PC cards, and is Windows 95, NT, and OS/2 Warp compatible. The device is equipped with dual slots to accommodate two Type I/II cards, or one Type I/II card and one Type III card.
Simple Technology: 714.476.1180; www.simpletech.com

Gotcha!

From AITech comes **AIGotcha!**, an affordable, external hardware solution for digital artists, graphic designers, and home PC enthusiasts. With a click of a button, AIGotcha! grabs images from any video source and stores them in any standard format. AIGotcha! also includes ARENA design and PhotoMorph 2 software, enabling users to model and render 3D objects, as well as animate and morph captured images. AIGotcha! supports high resolutions up to 1600x1200 and both composite and S-video. The package retails for $199.
AITech: 800.882.8184; www.aitech.com

Help for the Ham Fisted

If you're tired of those teeny keys on your notebook computer, check out the **NoteBoard.** This full-sized keyboard stands directly over a notebook's keyboard, to deliver all the functionality of a full-sized keyboard without the cluttered workspace caused by a docking station or a conventional external keyboard.

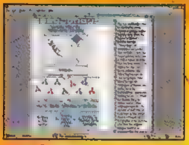
The NoteBoard features full-sized keys, a built-in wrist rest, dedicated numeric pad, and four adjustable feet that allow users to position the keyboard at six height levels. The NoteBoard also features LaunchBoard software to link function keys to web sites and applications. The Standard version retails for $79.95; the Plus version includes a mouse and retails for $99.95.
Darwin Keyboards: 888.432.7946; www.darwinkeyboards.com

Can't Get It Up?

Keep striking out? Then check out **The Lovers' Guide**, a comprehensive and intimate multimedia guide to sex and sexuality.

Based on the best-selling video of the same name, The Lovers' Guide CD-ROM features more than 40 minutes of explicit video; 300 full-color images; a cross-linked database of sexual, relationship, and anatomical terms; and personal advice about common sexual anxieties. Topics include: growth and change, intercourse, pregnancy, contraception, gender and orientation, and are appropriate for all ages, ranging from pubescent teens to men and women going through menopause. The disc is priced at only $29.98.
Mentorom Multimedia: 800. 214.3668; www.mentorom.com

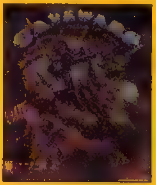
Immunobiology 101



Immunobiology Bookshelf is a comprehensive electronic database containing numerous reference resources in the study of immunology. The $59.95 disc contains the complete text and illustrations of two major immunology books; more than 250 recent reviews and case studies; 10,000 references from MEDLINE abstracts; and Kinemages, interactive 3D graphics of the major immunological molecules.

The CD-ROM also features hypertext links between the three main publications, and the ability to select and manipulate illustrations and captions to spruce up your presentations or reports.
Garland Books: 800.627.6273; www.garlandpub.com

A Spelunking We Will Go



Cavewars is a game of exploration, exploitation, and empire building set in the underground fantasy world of Ibido. Any combination of up to five human and five computer controlled players can play, taking on the characteristics of eight distinctive races. The game consists of five original levels, but users can create their own entire universe of random underground worlds. Cavewars also features 48 magic spells, three types of technologies, four types of magic, and weapons ranging from swords and flintlock muskets, to assault rifles and flex armor. Invest in research, and you can even build cannons, armored cars and self-propelled artillery. Cavewars is available now for $69.95.
Avalon Hill: 410.254.9200; www .members.aol.com/ahgames /avalon.html

Notebook Camera

Toshiba's new **IK-D30 PC** is a small, lightweight camera specifically for use with a notebook PC. The 2x3-inch device, which weighs just six ounces, delivers digital video with 640x480 resolution directly to the host's system bus via a high-bandwidth, 32-bit CardBus interface card. Suitable for both video recording and video teleconferencing, the $500 camera can stand freely or be clipped onto the notebook's LCD panel.
Toshiba: 800.631.3811; www.toshiba.com

To have your products listed in Radar, send product information to: radar@bootnet.com

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Product Information Number 110

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Product Information Number 153

Netscape: Student Section

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Product Information Number 83

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Best when viewed with
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Netscape Navigator
Will provide if needed

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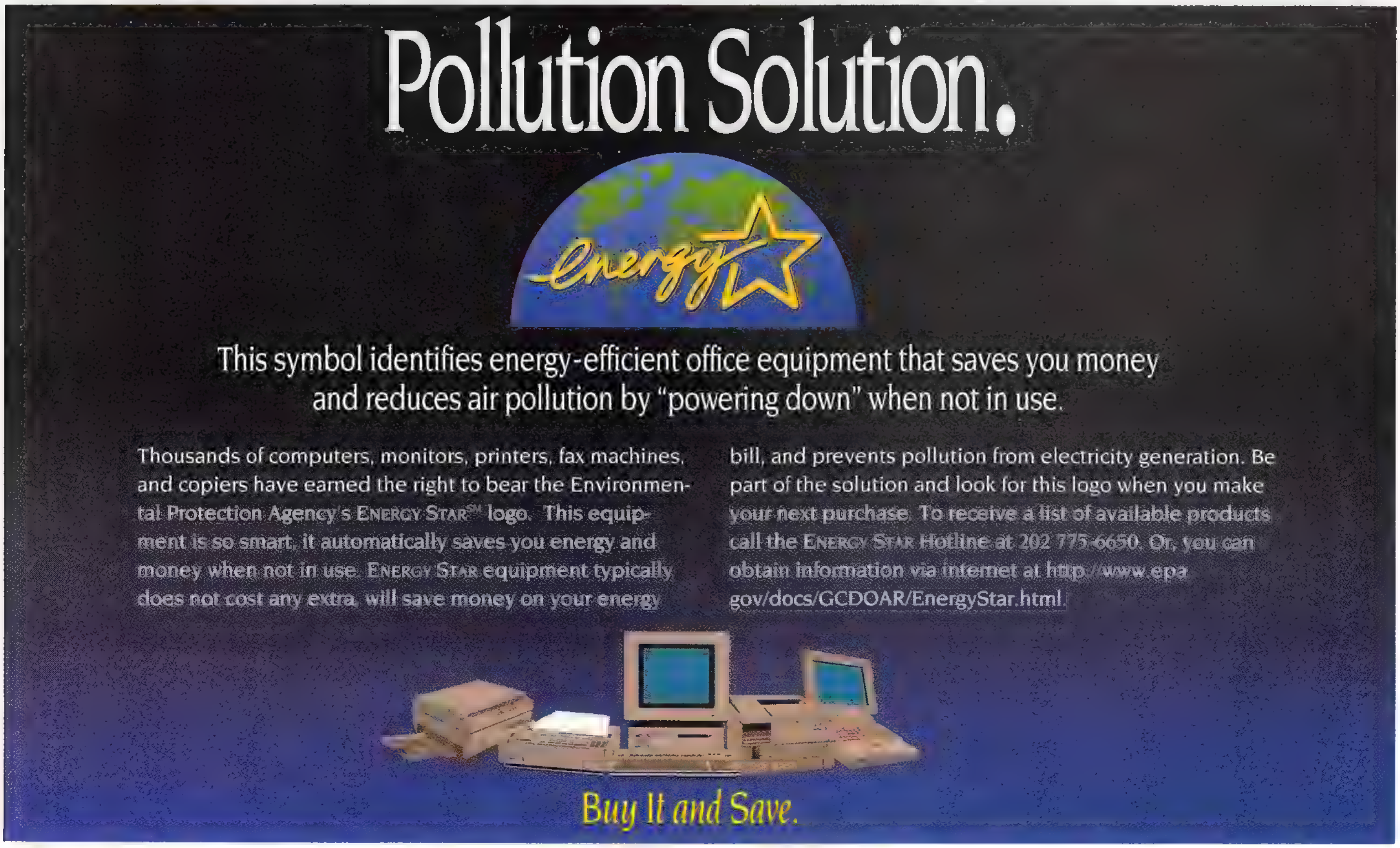
Product Information Number 360



Pollution Solution.

energy

This symbol identifies energy-efficient office equipment that saves you money and reduces air pollution by "powering down" when not in use.

Thousands of computers, monitors, printers, fax machines, and copiers have earned the right to bear the Environmental Protection Agency's ENERGY STAR℠ logo. This equipment is so smart, it automatically saves you energy and money when not in use. ENERGY STAR equipment typically does not cost any extra, will save money on your energy bill, and prevents pollution from electricity generation. Be part of the solution and look for this logo when you make your next purchase. To receive a list of available products call the ENERGY STAR Hotline at 202 775-6650. Or, you can obtain information via internet at http://www.epa.gov/docs/GCDOAR/EnergyStar.html.

Buy It and Save.

boot labs Review Policies

__boot__ isn't like any other computer magazine, and neither is our product __evaluation__ process. We don't test equipment in the cold, sterile environment of a warehouse-sized lab, and we don't write our reviews based on the __test scores__ that lab-coat-wearing technicians scribble on clipboards.

Our review __scores__ are based on a combination of objective __benchmark__ testing, real-world performance, and our __subjective__ evaluation of features, performance, and the many less tangible __characteristics__ that go into a product. All of our evaluations are based on __hands-on__ use of the product.

123456789
BOOT RATING
5
WINDOWS GRAPHICS
5
DESCENT II
5
QUAKE
boot-o-meter
5
PREMIERE TRANSITION
5
PHOTOSHOP FILTER
5
LIGHTWAVE 3D RENDER

The boot-o-meter explained

For our tests, we use Ziff-Davis' WinBench 96 suite of benchmarks to measure CD-ROM and hard-disk drive performance (kilobytes per second), as well as graphics speed under Windows (millions of pixels per second).

All systems are tested at 1024x768 resolution with 16-bit color depth. All notebooks are tested at 800x600 resolution with 16-bit color depth (they're also tested at higher resolutions, if higher resolutions are supported).

We judge DOS video performance by measuring the number of frames per second that a system is capable of pumping out while playing games such as *Descent II* (at 640x400 resolution) and *Quake* (at 640x480 resolution on desktop systems; 320x480 res on notebooks).

In our real-world tests, we measure how long it takes a system to perform specific tasks: rendering a video transition in Adobe's *Premiere*, applying a Gaussian-blur in *Photoshop*, and rendering a wireframe scene in NewTek's *Lightwave 3D*.

The performance is gauged on a scale of 1 to 9 in each of these areas; we then average the scores, and arrive at an overall performance rating. The details of each test (specific frame counts and such) are always available on the *bootNet* Web site at **www.bootnet.com**.

Our performance scales are based on systems that we consider to be among the best in their class, and we change those reference standards every six months. If the system reviewed equals or exceeds the performance of the reference platform (a score of five or better), the boot-o-meter dial is green; if it scores a four, the dial is yellow; and if it scores a three or less, the dial is red.

Our Reference Desktop PC

***Gateway's P5-166XL** is our reference desktop computer because it's a workhorse, delivering solid benchmark scores all around. Systems shipped since the P5-166XL—especially 200MHz Pentium systems—should at least match its performance.*

Our Reference Notebook PC

*We selected **Fujitsu's Monte Carlo** as our reference notebook because of its excellent benchmark scores. The Monte Carlo's use of more expensive VRAM, instead of the slower DRAM, resulted in exceptional graphics performance.*

The bootVerdict

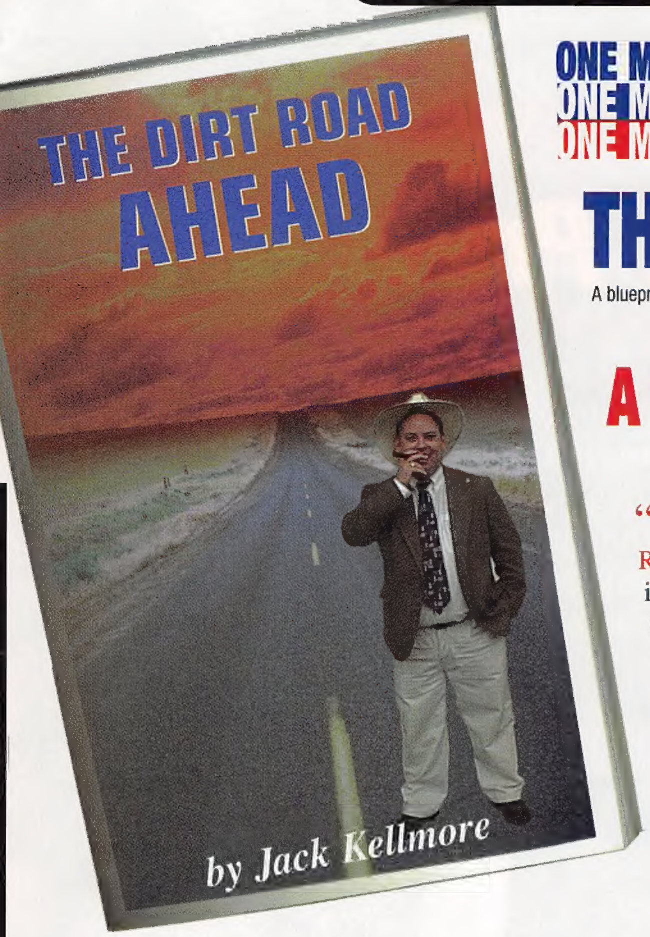
The fastest computer in the world is useless if it's poorly designed. That's why we evaluate a host of subjective criteria in addition to rigid benchmarks. We look at a machine's overall design, its ergonomics, expandability, ruggedness, and advanced features.

We also carefully consider a manufacturer's component choices, including the quality of the sound card, speakers, modem, keyboard, and mouse. We count expansion slots and drive bays. We take off the case and put it back on. We plug in drives and cards to judge how easy—or difficult—it is to expand the machine. These might seem like minor considerations, but they have an enormous impact on the level of satisfaction a new computer delivers. Our final rating is an amalgamation of the objective benchmark ratings and these subjective judgements.

DOUBLE TAKES
GIVE A SECOND EDITOR'S HANDS-ON OPINION OF THE SYSTEM BEING REVIEWED.

boot KICK ASS! PRODUCT

Only the best earn enough respect to be worthy of our editors' choice award.



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FEARLESS Predictions...

"The traditional hard disk will soon be harder to find than a Turbo Regal that ain't got a ding on its fanny. The future of data storage, see, is in fish eggs—dynamically distributed, readable, writeable fish eggs. The key lies in selective breeding. KellmoreCo fish eggs will be genetically predetermined to stack themselves in neat little strings of ones and zeros. All it takes is a little electrochemical zippy-zap, and Charley the Tuna is working for you, boss. Of course, my men in R&D say the idea won't fly, but I've got a diagram on a cocktail napkin that says they're wrong."

BOLD Visions...

"To celebrate our great nation's unconquerable can-do spirit, KellmoreCo has ponied up the jingle to launch the most ambitious archiving project of all time: The Library of Congress Hyperlink-o-Rama. Every document in the Library of Congress will be scanned with OCR software, saved as ASCII text, and entered into a central database. Every single word in the database will then be hyperlinked to every other single word in the database, and, just like that, boom, you've got the most powerful record of human thought ever imagined. I reckon this will require about 600 terabytes of hard disk space, or about 50 to 60 pounds of mutant fish eggs. Of course, the boys on the fifth floor say I'm off my rocker, but I say the American people are capable of anything."

Fond MEMORIES...

"It was 1989. I had just finished the second day of Comdex, and me, a guy from Electronic Data Systems, and a couple of off-duty policemen were getting rowdy at the Satin Saddle, shooting liar's dice, and watching the hoochie-coochie show. In walks this skinny fella to use the pay phone. He's still got his convention pass around his neck. I ask him what company he's with, but he just ignores me. So I ask him again. No answer. And I ask him again. Still no answer. By this time, Perot's falling out of his chair laughing, and the two smokies are egging me. So I get up, drag the guy into the john, and start working him over. Pretty soon the EDS fella and the cops are getting their licks in too, and when the guy passes out, we dress him up in one of the stripper's cowgirl costumes, smear lipstick all over his face, and leave him in the lobby at Caesar's. Between that and all the hookers, that was my favorite Comdex ever."

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THE MAN

Jack Kellmore: industrialist, billionaire, patriot.

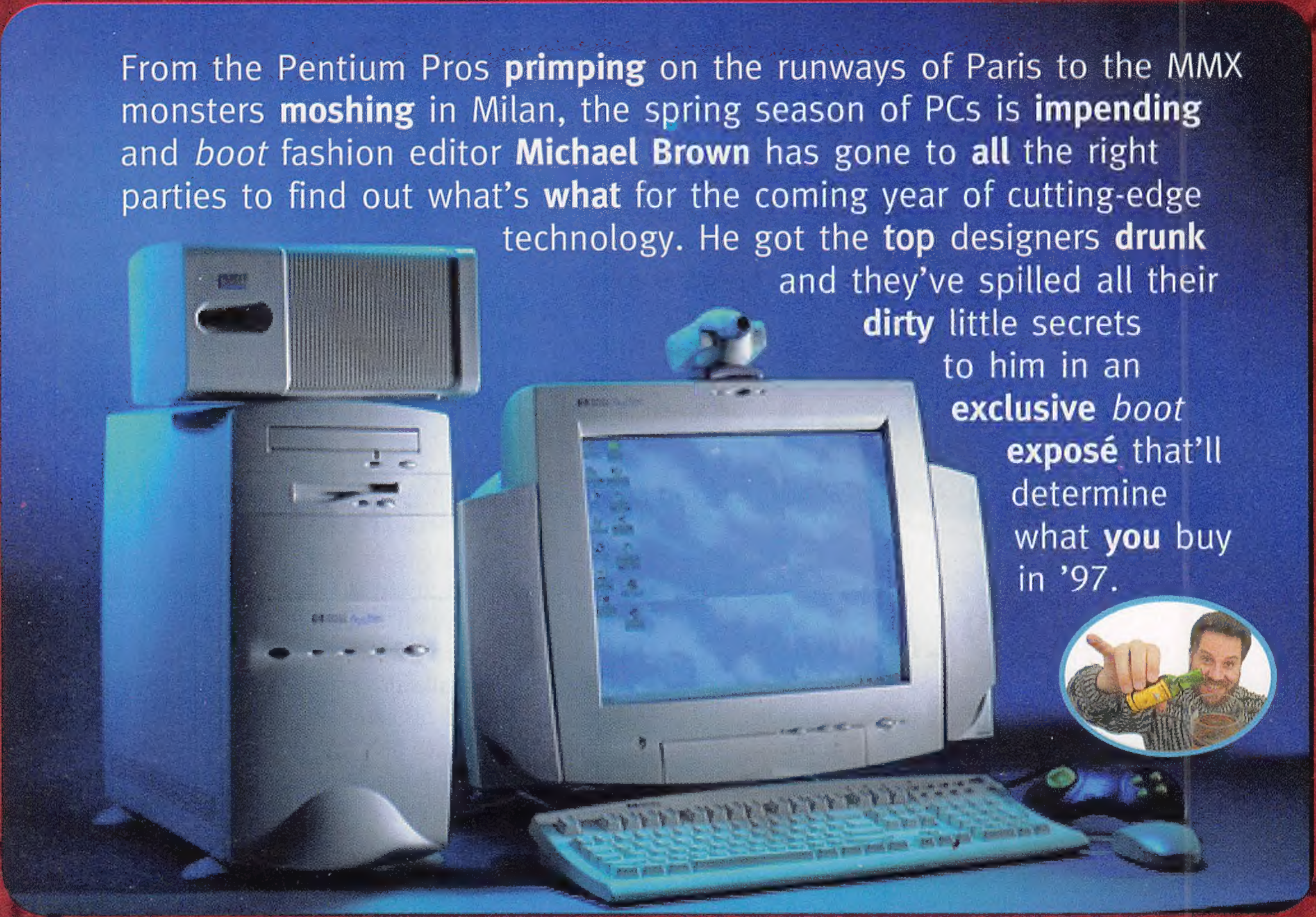
A gurgling infant in swaddling clothes, John Joseph "Small Block" Kellmore was discovered in 1952 in the returns lot of Bucky Peete's Parts 'n' Sparks of Pissant, Nebraska. For the next 22 years, the star-blessed maverick lived at the Pissant Technical Institute For Boys, where he studied theology, plastics, and automotive sciences under Father Joseph "Big Block" O'Gallagher. In 1976, Kellmore shifted his attention from muscle cars to muscle computers, and celebrated the nation's bicentennial by graduating *magna cum laude* from the Control Data Institute in Grain Silo, Kansas. In 1977, he returned to Nebraska to open Kellmore Co's flagship research center in downtown Feedbag.

THE EMPIRE

KellmoreCo International owns and operates a number of thriving research centers across the planet. In addition to the original triumvirate of facilities in Feedbag, Nebraska, Scab City, Missouri, and Sump Pump, Ohio, the KellmoreCo dream extends to Bangkok, Beijing, Buenos Aries, Jakarta, Mexico City, Vladivostok, and, most recently, Bhopal, India. The privately owned corporation currently employs some 58 senior engineers who oversee a work force of more than 62,000 spirited day laborers. In addition to manufacturing microchips, conducting pure research experiments, and financing American political campaigns, KellmoreCo International owns 80 percent of the world's PVC tubing market, and makes the perfume ads that appear in all those high-class magazines.

COMINGNEXTMONTH

Spring System Preview!



From the Pentium Pros **primping** on the runways of Paris to the MMX monsters **moshing** in Milan, the spring season of PCs is **impending** and *boot* fashion editor **Michael Brown** has gone to **all** the right parties to find out what's **what** for the coming year of cutting-edge technology. He got the **top** designers **drunk** and they've spilled all their **dirty** little secrets to him in an **exclusive** *boot* **exposé** that'll determine what **you** buy in '97.

Author! Author!

Make your own games

Who hasn't dreamed of creating their own software? Next month, we provide all the tutelage, resources, and software you need to make miracles happen, in a step-by-step feature.

bootWorthy: 3D Cards

We waited until the second generation of accelerators had come of age before choosing the very best. Next month's bootWorthy tells you which card should be pumping up your frame rate and filtering trilinearly and mapping MIPs on your pride and joy.

boot

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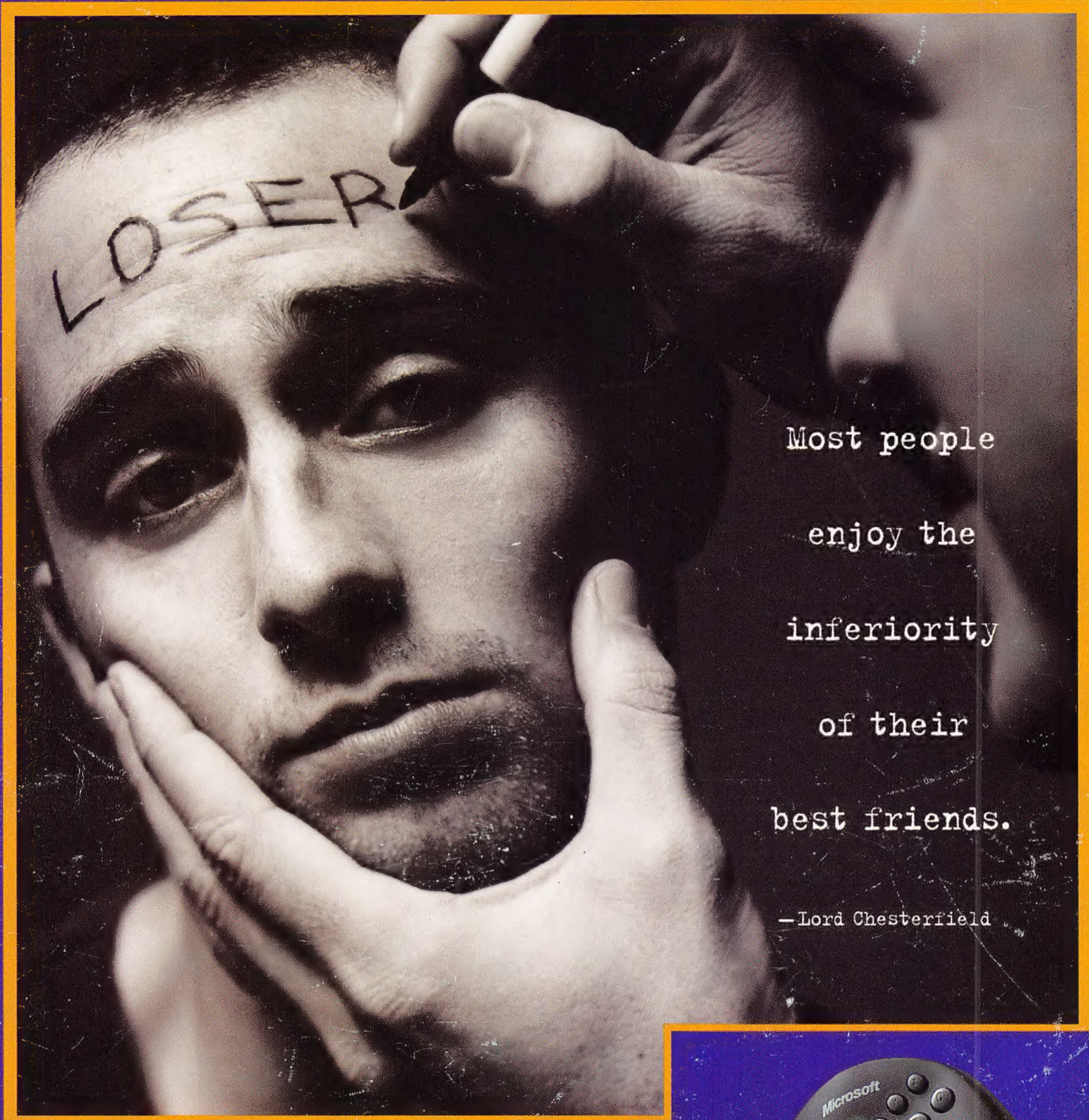
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Microsoft

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